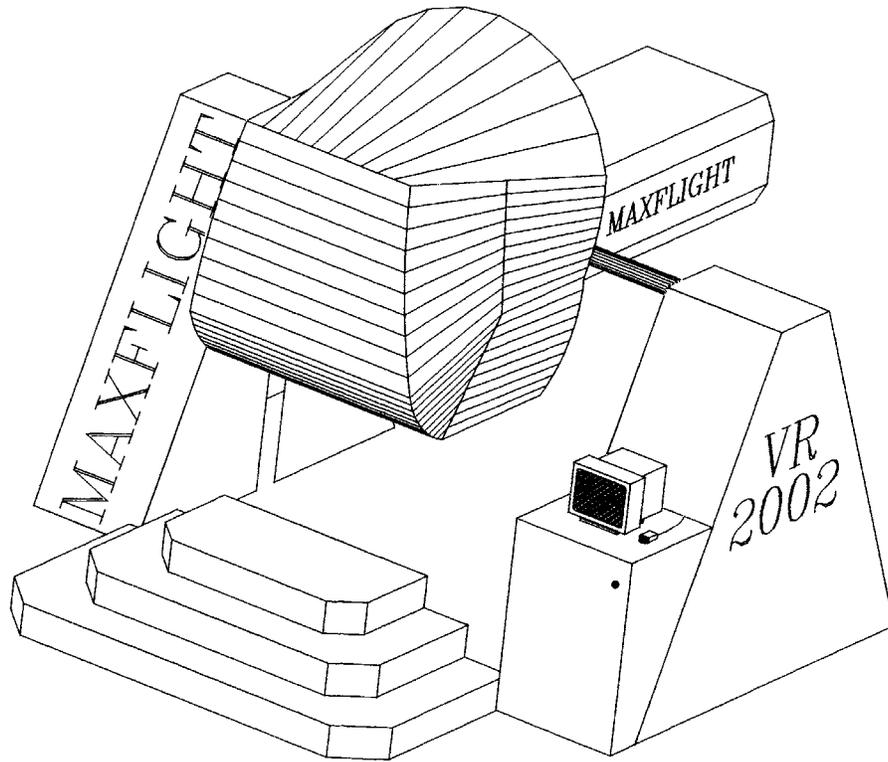


# MaxFlight VR2002 VR2500

## Manual



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## APPENDIX A – SITE CONFIGURATION REQUIREMENTS

To determine the site configuration, there are several factors that need careful attention.

### **1 - Available Floor Space**

Each unit has a footprint of 12' 8" (3.9 m) wide by 15' (4.6 m) deep, including the loading platform. Depending on the site topography, the actual configuration will vary.

### **2 - Ceiling Clearances**

The ceiling height requirement is 12' 8" (3.9 m) with a pathway of approximately 4' (1.2 m) wide at the top, 2' (0.61m) either side of center.

### **3 - Floor Loading Capabilities**

Floors must be able to support the weight of the units. To obtain this information, consult an engineer or an architect.

Approximate Unit Weight – 4800 lbs. (2181.8 kg)

Load Distribution per Square Foot – 25.26 lbs. (11.4 kg)

### **4 - Aisle Clearance**

Consult local building codes. A minimum of 6' (1.83 m) is recommended, but should not supersede the local building codes.

### **5 - Entrances & Exits**

Egress routs must be clear and unobstructed. Local building codes will dictate.

### **6 - Environment**

Keep facility operating temperature reasonably stable. Temperatures less than 80 degrees Fahrenheit with humidity levels less than 60% would keep patrons comfortable and keep equipment functioning well. Also, for the best visual effect, facility lighting should be kept low.

**Warning – If the environment is not stable it will cause damage to the electronic equipment.**

### **7 - Floor Finishes**

A carpeted floor is the preferred floor finish. Tiled floors and bare concrete floors are okay but may require placing the machine on an anti-slip pad.

### **8 - Truck Routes**

Depending on the size of the purchase, there could be a need to have access to the facility capable of accommodating large freight trucks, which require maneuvering room.

### **9 - Docking**

Obtain and forward dock heights before shipping arrangements are made so that accommodations can be made for the ease of unloading.

### **10 - Freight Elevators**

When installing units that are above the ground or dock level of your facility, examination of freight elevators for capacities, size and operability is necessary. Schedule time and operators for the day of delivery where applicable.

## **11 - Electrical Configurations**

### U.S. CONFIGURATION

Facilities with available three-phase service need:

- A. 2 circuit single-phase, 110 volts, 20 amp, 60 Hz
- B. 1 circuit three-phase, 208 volts, 30 amp, 60 Hz

### EUROPEAN CONFIGURATION

Facility requirements are:

- A. 2 circuit single-phase, 220 volts, 10 amp, 50 Hz
- B. 1 circuit three-phase, 230 volts, 20 amp, 50 Hz

### HONG KONG CONFIGURATION

Facility requirements are:

- A. 2 circuit single-phase, 110 volts, 15 amp, 50 Hz
- B. 1 circuit three-phase, 230 volts, 20 amp, 50 Hz

## **12 - Public Barrier System**

Barriers may need to be set up to restrict patrons from coming within reach of the machine while in operation. It is not the responsibility of MaxFlight to provide or install the public barrier system.

## **CHAPTER 1 – INTRODUCTION**

### **1-1 Introduction to the VR2002**

Welcome!! And thank you on your purchase of the VR2002 Cyber Roller Coaster. The VR2002 is the only full motion interactive experience of it's kind. This is a dual seat roller coaster based on a virtual reality environment with a full 360 degree, 2 axis motion platform. The experience time and track selection can be varied according to patron demand while the standard time set is 2 minutes. You can select various track layouts thus making each ride as unique as possible.

### **1-2 Overview of the VR2002**

The VR2002 is a computer driven simulator that provides a futuristic roller coaster ride. The customers can select their own unique track layout. This system allows for the feel of an actual roller coaster without having to leave the comforts of your facility.

### **1-3 Overview of the Ride Selection System**

The customers can select their own unique track layout. This system is in the form of a kiosk that enables customers to enter their name and choose between a six (6) or nine (9) track segment ride from a library of available track pieces, from corkscrews, loops, and rolls, to drops and tunnels. Once track selection is complete, the customers board the two (2) passenger cockpit equipped with a huge 58" projection screen and a pulse pounding surround sound system. Once the cockpit is closed and locked, the passengers embark on a two (2) to three (3) minute roller coaster ride they will never forget.

### **1-4 Specific Ride Information**

This section has been included in your manual to give you specific and detailed information about the VR2002 Cyber Coaster. This information complies with the ASTM 698-94 standard (American Society for Testing and Materials) which governs Physical Information to be provided for Amusement Rides and Devices.

Ride Speed: Pitch Axis - 90 Degrees per second (15RPM)

Roll Axis - 90 Degrees per second (15 RPM)

Direction of Travel: Pitch – 360 Degrees  
Roll – 360 Degrees  
Vertical axis (Y-axis)

Maximum passenger capacity by weight per passenger position: 250 lbs.

Maximum passenger capacity by weight per the total device: 500 lbs.

Maximum passenger capacity by number per the total device: 2

Duration of passenger exposure: 6 segment ride – 2 minutes (approx.)  
9 segment ride – 3 minutes (approx.)

Passenger weight distribution: Maximum Unbalance – 100 lbs.

Environmental restrictions: Stable Environment – Temperatures less than 80°F,  
Humidity less than 60%

Recommended passenger restrictions: Minimum Height – 48”

Mechanical power requirements: The hydraulic system operates at approximately  
2000 psi. The hydraulic lift circuit operates at approximately 1200 psi.

Static information: Height: 7’ 9” (approx.)  
Width: 12’ 8” (approx.)  
Length: 15’ (approx.)  
Weight: 4800 lbs.

Dynamic information: Height: 12’ 8” (approx.)  
Width: 12’ 8” (approx.)  
Length: 15’ (approx.)  
Weight: 5300 lbs. maximum

Fastener schedule: Refer to the *MaxFlight VR2002 Cyber Coaster Installation Manual*

Maximum static load distribution per footing: NS – based on static weight distributed by  
(4) 8” x 16” feet and  
(2) 4” x 14” feet

INA = Information Not Available    N/A = Not Applicable    UNK = Unknown    NS =  
Not Specified

### **1-5 Ride Restrictions**

All patrons riding the VR2002 Cyber Coaster must meet the following requirements:

### **1-5A Height Requirements**

Patrons riding the VR2002 Cyber Coaster must be taller than 48 inches (1.22 m).

### **1-5B Impairments**

We recommend that patrons with the following impairments/conditions do not ride the VR2002 Cyber Coaster:

- ◆ Head, neck, heart or back problems
- ◆ Recent operations
- ◆ High blood pressure
- ◆ Motion sickness
- ◆ Women who are pregnant
- ◆ Epileptic patrons; due to the special strobe and lighting effects that are known to trigger seizures
- ◆ Intoxicated patrons
- ◆ Claustrophobia

### **1-6 Safety**

Due to the nature of the VR2002 there are several safety precautions that must be observed in order to ensure the safety of both the patrons and the operators during operation of the experience.

**1-6A** Ensure that the cockpit has completed movement prior to continuing with any other procedures.

**1-6B** Ensure that during any time the hydraulics are enabled that people stay clear of the simulator to prevent injury due to the movement of the simulator.

**1-6C** Ensure that the operating personnel do not operate the simulator with any of the cover plates removed.

**1-6D** Ensure that only authorized personnel open the power distribution box for any reason.

**1-6E** Ensure that patrons pass the height and weight requirements to ride the simulator.

### **1-6F Queue Line Safety**

The queue line must be kept orderly. The patrons must remain behind the established barriers while waiting their turn to ride. The queue line should also be used to familiarize patrons with the operation of the Occupant Panic Switch (OPS) Button as well as the track selections.

### **1-6G Loading/Unloading Safety**

During the loading and unloading of patrons, the operator must ensure that the simulator has come to a complete stop prior to opening the cockpit. The operator is required to assist the patrons to negotiate the platform and cockpit.

**1-6H** During the operation of the simulator, the operator must stay within the proximity of their assigned units. Operators must watch for such things as equipment failure, abuse of the simulator and customers who wish to terminate game play.

**1-6I** During the operation of the ride, the operator(s) should be posted at the podium where the computer screen, mouse and unit will be in his/her direct line of sight.

## **CHAPTER 2 – OPERATION**

### ***2-1 Description of Motion During Operation***

There are three basic axes of motion that the simulator travels on, Pitch, Roll and vertical lift into the game position.

#### **2-1A The Pitch Axis**

The pitch axis will rotate the cockpit in either a clockwise or counterclockwise direction. The maximum velocity the pitch axis will produce is 90 degrees per second.

#### **2-1B The Roll Axis**

The roll axis will rotate the cockpit in either a clockwise or counterclockwise direction. The maximum velocity the roll axis will produce is 90 degrees per second.

#### **2-1C The Vertical Lift System**

The vertical lift system raises and lowers the main assembly into the load and ride positions.

### ***2-2 System Startup Procedures***

The procedures listed below must be followed in order to ensure the simulator operates in a safe condition.

1. Verify that the GREEN power light is on inside the power distribution box.
2. Turn MAIN POWER switch ON (left switch on the power distribution box).
3. Turn on the computer and monitor – allow time for the system to start up.
4. Double click on the VR2002 icon, a control box will appear.
5. Click on CONTROL.
6. Click on START.
7. When program is initialized, turn COCKPIT POWER switch ON.
8. Turn on the projector in the cockpit using the gray remote or by manually pushing the RED button on the projector.
9. Pull the RED Hydraulic E-Stop UP; depress the green start switch. The system will be ready for operation in ten (10) minutes.

### ***2-3 Height and Weight***

- Maximum total weight for the ride is 500 lbs. (226.8 kg) with no more than a 100 lb. (45.4 kg) difference between the passengers.
- Minimum height requirement for the ride is 48 in. (1.22 m)

### ***2-4 Game Selection***

Patrons should be encouraged to make their game selections while waiting in the queue line.

### **2-5 Customer Pockets**

The attendant should ask each patron if they have any objects in their pockets that could come out during the ride. If so, remove and place the items in a secure container for the duration of the ride. Be sure to remind patrons at the end of their ride to retrieve their possessions.

### **2-6 Recommended Passenger Loading Procedures**

Assist the passenger into the cockpit and tell them to put on the primary restraint, the seatbelt. Lower the restraint harness until it is snug against the waist and chest. Render any assistance or instructions required. This is a good time to give the patrons instructions on how to use the Occupant Panic Switch. After it has been explained, they should be asked if they understand how to use it. Close the canopy and secure it with the locking device.

### **2-7 Description of Passenger Restraint System**

There are two restraint systems employed for passenger comfort and safety, a primary and a secondary.

#### **2-7A Primary Restraint**

The primary restraint system is similar to an Airline safety belt. It simply pulls around the passenger and plugs into the receptacle. It is then tightened with the pulling of the strap.

#### **2-7B Secondary Restraint**

The secondary restraint system consists of a molded structural steel bar shaped to fit the passenger. The bars are covered with padding and vinyl covers for passenger comfort. Once lowered into place, the passengers cannot release themselves, preventing inadvertent discharge. To operate, have the passenger lower the harness to their comfort, then check it for security and that it is locked.

### **2-8 Game Start Procedures**

#### **2-8A Raising the Unit**

With the Hydraulic system powered, click on the raise icon. The unit will come up about two (2) inches and stop to balance. Upon completion of balancing, the unit will continue raising up to the upper limit switches. If the unit does not balance within three (3) minutes, lower the unit and retry.

NOTE: The weight limit is 500 pounds.

#### **2-8B Configuring the Game**

There are four standard track options; each one presents a different perspective of the roller coaster operation. In addition to the standard layout, a kiosk allows the customers to select the individual track segments they want. The options are as follows: 1)

Customer Track Selection (If KIOSK is used)

2) Nine Segment Standard

- 3) Six Segment Standard
- 4) Nine Segment Random
- 5) Six Segment Random

### **2-8C Game Start**

Click on the START icon. The unit will begin to load the required databases for the game selected.

### **2-9 Operation Control Icons**

There are three (3) icons that can be used during the game by the operator to suspend or restart the game.

#### **2-9A Pause Icon**

Should there be a need to pause the ride, the pause icon will return the unit to the home position and the computer images will freeze in place.

#### **2-9B Continue Icon**

The 'continue' icon will restore full motion to the simulator and allow the passengers to complete the ride.

#### **2-9C Terminate Icon**

This icon will terminate the ride and return the unit to the home position.

### **2-10 Game Over**

When the time runs out, the main screen will display GAME OVER. During this time the unit will return to "home" position. When the unit has completed its movement phase the computer screen will return to the CONFIGURE GAME display. It is now safe to lower the unit. Click on the 'lower' icon. After the unit has lowered onto the stairway and all movement has stopped, discharge the patron.

### **2-11 System Shutdown**

At the end of the operating day, follow these procedures to ensure that the simulator is safely secured for the day.

1. Lower the passenger restraint harness to the down position.
2. Turn off the projector by either using the gray remote or by pushing the RED button on the projector.
3. Push the Hydraulic E-Stop button down.
4. Click on the VR2002 icon, lower left of Main screen, the Control Box will appear.
5. Click on CONTROL.
6. Click on STOP.
7. Click on the left corner Start icon.
8. Click on Shutdown.
9. Click on YES.
10. Turn the COCKPIT POWER off after projector cools down.
11. Turn MAIN POWER off, unit is now secured.

## **2-12 Emergency Stop Procedures**

In the event of an emergency follow the procedures described below for the type of emergency.

### **2-12A Occupant Panic Switch**

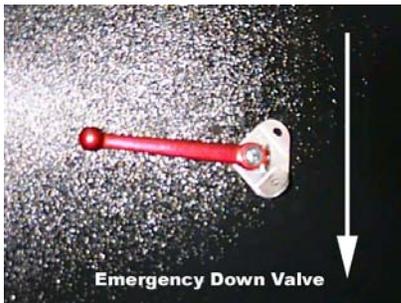
During the ride the patrons have the ability to initiate a ride abort by depressing the **Occupant Panic Switch** (Labeled “**Safety Stop**” in the cockpit). When this switch is depressed the ride will return to the “home” position, the video projector will freeze and the sound will stop. Once the unit is level, lower the unit by clicking the “lower” icon on the computer screen. When the unit is completely lowered onto the stairway, open the cockpit door and ask the riders if they would like to continue. If they do not wish to continue, discharge the passengers following the Passenger Unloading Procedure. If they wish to continue, close the canopy and secure it with the locking device. Click on the “raise” icon and once the unit is completely balanced and raised click on the “continue” icon to complete the ride.

### **2-12A Emergency Termination Procedures**

In the event of an emergency not involving the simulator directly, click on the ‘Terminate Game’ icon on the screen. Wait for the unit to level, then lower the game as normal. In the event that the unit is not responding to the commands, use the Hydraulic Main Shut-Off Switch and terminate the hydraulic pump. The unit will then have to be lowered manually as described in section 2-12B. Assist the patron out of the simulator and direct them to the exit.

### **2-12B Emergency Stop without Electrical Power**

The Red Emergency Stop Button on the podium must be depressed IMMEDIATELY; this will disable the hydraulic system. Level the unit on both the pitch and roll axis. Using the manual down valve on the side of the unit, lower the unit to the base. Open the canopy and release the restraint harness using the release pin and assist the patron from the cockpit.



## **2-13 Power Interruptions and Restart Procedures**

Should the power be interrupted, the following procedures should be followed.

### **2-13A Facility Emergency Lighting**

Facility emergency lighting must be configured to allow attendants and patrons enough lighting to safely exit the ride.

### **2-13B Restart Procedure**

Even if the power comes back on before all of the units have been lowered, do not turn the Hydraulics back on, continue to lower the unit(s) to their lowered position. At this time you can follow the normal Start-up procedures.

## **2-14 Ride and Facility Evacuation Procedure**

Terminate the ride from the PC. Quietly and calmly, have the queue line begin exiting the facility. Lower the unit(s), open and unbuckle all patrons and assist with the evacuation of the facility. Follow the system shut down procedure if time permits or at least make sure that all power is turned off to the hydraulics, the computer and the power distribution box. NOTE: It is most important that the power to the hydraulics is disabled and can be quickly accomplished.

## **2-15 Ride Termination Conditions**

1. Any abnormal vibration or abrupt motion changes that would not be considered part of the normal operation.
2. Any undue movement of either the fiberglass, covering panels, A-frames or any hinges or fabricated metal that would indicate fatigue, fracture or loose bolts.
3. Any hydraulic fluid which would appear to be a leak or an abnormal amount of collection.
4. Any type of electrical problem that would effect continuation of the game and could include electrical problems within the building that could inadvertently affect the operation of the simulator.
5. Any computer malfunction which would include system lock-up, program termination or any other condition that would affect game play.
6. Any condition with the hydraulics that is abnormal (i.e. the TV set showing a roll where the simulator remains stationary).
7. Any loose objects that roll around inside the cockpit as these items would damage the patron as well as the components inside the cockpit.
8. Any signs that the concrete anchors may be loose by allowing the unit to walk or move.
9. Any signs of smoke or sparks which would indicate the potential for fire.
10. Any condition where the passenger was tampering with the system such as pounding on the fiberglass or undue pressure on the cockpit.

## **2-16 Operational Restrictions**

There are certain conditions that the machines should not be operated under. These conditions are described below.

### **2-16A Intoxication**

If a patron is under the influence of any drugs or alcohol they should not be allowed to utilize the equipment.

### **2-16B Heart Conditions**

Any heart or other similar condition would preclude a passenger from riding the simulator.

### **2-16C Pregnancy**

It is not recommended that women who are pregnant ride the simulator.

### **2-16D Weight and Height Restrictions**

The patrons must be at least 48" (1.22 m) tall and total weight is not to exceed 500 lb. (226.8 kg) with no more than a 100 lb. (45.36 kg) difference between the passengers.

### **2-16E Electrical Storms**

It is up to the discretion of the owner operator to operate during an electrical storm. However, it is NOT recommended to rely on the internal facility safe guards to protect the equipment. When in doubt, shut down the system to ensure safety of not only the passengers but also the safety of the system.

### **2-17 Daily Inspection Checklist Description**

The Daily Checklist is to be completed by the first shift attendant operating the VR2002 as well as the second shift attendant (if applicable) at the beginning of his/her shift. These sheets must be filled out on a daily basis. DO NOT check off the items in the checklist unless you have performed the required inspection. This maintenance is required to maintain optimum performance of the VR2002. The master copy of this checklist can be found at the end of the *Operator's Manual*.

## **CHAPTER 3 – SUGGESTED POSTINGS**

This chapter contains notices that we suggest be placed near the unit to promote the safety of patrons as well as operators and to ensure proper operation of the ride.

*MaxFlight Corporation*  
**750 Airport Road • Lakewood, NJ 08701**  
 Phone: (732) 942-9898 Fax: (732) 942-1114

VR2002 Daily Inspection Checklist

Date of Inspection: \_\_\_\_\_ AM Inspected By: \_\_\_\_\_  
 PM Inspected By: \_\_\_\_\_

**\* These sheets must be filled out completely and kept in your records.**

**AM Check      PM Check**

- |       |       |   |
|-------|-------|---|
| _____ | _____ | Make sure the surge suppressor is operating properly (green light)                        |
| _____ | _____ | Inspect projector for proper operation and cleanliness                                    |
| _____ | _____ | Make sure that the ductwork is secure and functioning properly                            |
| _____ | _____ | Check to see canopy sensor works properly   |
| _____ | _____ | Make sure the sound system and speakers are secure and operational                        |
| _____ | _____ | Make sure the Occupant Panic Switch is functioning properly                               |
| _____ | _____ | Inspect harnesses for proper operation and condition                                      |
| _____ | _____ | Inspect seat belts for proper operation and condition                                     |
| _____ | _____ | Make sure safety clips are secured properly   |
| _____ | _____ | Make sure the screen assembly and padding are secure and in good condition.               |
| _____ | _____ | Make sure canopy alignment pins are tight   |
| _____ | _____ | Inspect the Cockpit latch for proper operation and condition                              |
| _____ | _____ | Check platform (stairway) for any movement  |
| _____ | _____ | Ensure the Emergency Hydraulic Shut Off Switch is functioning properly.                   |
| _____ | _____ | Check for any visible hydraulic fluid   |
| _____ | _____ | Check the Hydraulic Filter Delta-P, if extended, replace filter                           |
| _____ | _____ | Make sure the Hydraulic Oil Cooling Fan is plugged in                                     |
| _____ | _____ | Make sure radiator is clean   |
| _____ | _____ | Make sure the tail boom stand is in good condition and its proper position.               |
| _____ | _____ | Make sure the concealment panel on the tail cover is secure                               |
| _____ | _____ | Ensure that the molding on the tail cover is intact and secure                            |
| _____ | _____ | Make sure tail cover bolts are snug   |
| _____ | _____ | Inspect fiberglass for any visible damage   |
| _____ | _____ | Make sure all pine tree fasteners are in place and secure                                 |
| _____ | _____ | Check for general ride cleanliness  |
| _____ | _____ | Visually inspect any entrances, exits, stairways, ramps, fencing, guarding and barricades |
| _____ | _____ | Ensure the Manual Lowering Lever is functioning properly                                  |

NOTE: When inspection is completed, run one full ride cycle to ensure all system components function prop

# *EMERGENCY PROCEDURE*

## **POSTINGS**

### Emergency Stop Procedure

**The Red Emergency Stop Mushroom Button MUST be depressed IMMEDIATELY. This will deactivate the Hydraulic System. The unit will need to be leveled manually on both the Pitch and Roll axes. On the podium side of the unit, there is a manual let down lever on the inside rear cover panel. Push the lever down until the unit lowers from the elevated position. Open the canopy, pull the Quick Release pin on the topside of the harness system and remove the patrons if necessary.**

### **Ride and Facility Evacuation Procedure**

Terminate Game Play from the host PC. Quietly and calmly, have the Queue line begin exiting the facility. Lower the unit, open the canopy, raise the harness(s) and unbuckle the patron(s), then assist with the evacuation of the facility.

## *PATRON NOTICE*

Maximum Passengers Per Ride: 2

Maximum Combined Weight: 500 lbs. / 226.8 kg

Minimum Height Per Passenger: 48 in. / 1.22 m

This ride is **NOT RECOMMENDED** for persons who:

- Are under the influence of alcohol or any type of drugs.
- Are pregnant.
- Suffer from Motion Sickness or Claustrophobia.
- Anyone having Heart Conditions, Back or Neck Ailments or any Serious Disabilities.
- Epileptic patrons; due to the special strobe and lighting effects that are known to trigger seizures

All loose articles such as pens, loose change, etc. that may come off during flight should be removed.

- Patrons have a responsibility to exercise good judgment and act in a responsible manner while riding the VR2002/MT3000.
- Patrons have a responsibility to become familiar with and obey all oral and written warnings and instructions prior to and during their use of the VR2002/MT3000.

The MaxFlight VR2002/MT3000 is intended for the enjoyment of patrons and the above information is for your safety and well being.

# ***NEW EMERGENCY RAISE PROCEDURES***

**FOR**

## **HYDRAULIC MACHINES**

This Emergency Procedure to be used anytime if/when the Motion Platform lowers in a abnormal way, ie: Contacts the stands, floor or is stuck half way between all the way UP or DWN.

1. Anytime an abnormal action occurs on the motion platform the operator **MUST** immediately depress the **RED E-Stop** on the command console.
2. Verify that the **E-Stop is depressed**.
3. On the **Lower Right** corner of the **Task Bar, Right Click** with the mouse on the icon that contains a **Checkmark in a green circle**. This opens a Properties window.
4. Click on **Emergency Raise**, another control window will open up showing a **STOP** and **RAISE** icon.
5. Pull out the **E-Stop**, and press the **GREEN** start button on the command console. There should be minimum movement of the platform. Both pitch and roll valves will be disabled or locked thereby holding the platform where it is.
6. Click on **RAISE** icon, the unit platform will rise to the top. It will do so until it contacts the upper limit sensors and stop.
7. When motion platform is all the way UP, **DEPRESS E-STOP**.
8. Manually level the platform in Pitch and Roll.
9. Lower the platform using the manual lowering procedure. Once Pitch/Roll is level, depress emergency hydraulic lowering lever slightly downward towards the floor.
10. Lower all the way. When down on the stands open the cockpit and help patrons out.
11. Call Maintenance for repair and/or unit testing to certify that this unit is safe to operate.

*MaxFlight VR2002/VR2500 Emergency Raising  
Procedures*

**NOTE: ONLY APPLICABLE WHEN THE UNIT IS IN THE NOSE/TAIL DOWN  
POSITION WEDGED**

**BETWEEN THE STAIRWAY OR TAIL BOOM  
STAND**

**This occurs when either the operator or a patron  
inadvertently lowers the unit prior to the unit being in  
the “HOME POSITION” after or during a ride.**

**Immediately depress the Hydraulic Shut-off Switch  
With the mouse, left click the “STOP” icon on the  
“Maxflight Operator Panel”**

**With the mouse, bring up the “Maxflight Control  
Screen Panel” by clicking on the VR2002/VR2500 icon  
on the lower left side of the screen**

**Click on “Control” then “Stop”**

**Click on “Settings”, then Settings on the drop down  
menu**

**Click on the counterweight (upper menu bar) and then  
click on the “Disable Off Balance Protection” and apply  
now**

**Click on the Lift (upper menu bar) and then change the  
“Platform Lower Sensor” from set to clear, apply now**

**Click on the upper right side the x in the box, select  
“NO” and the control panel will appear**

**Click on “Control” then “Start”**

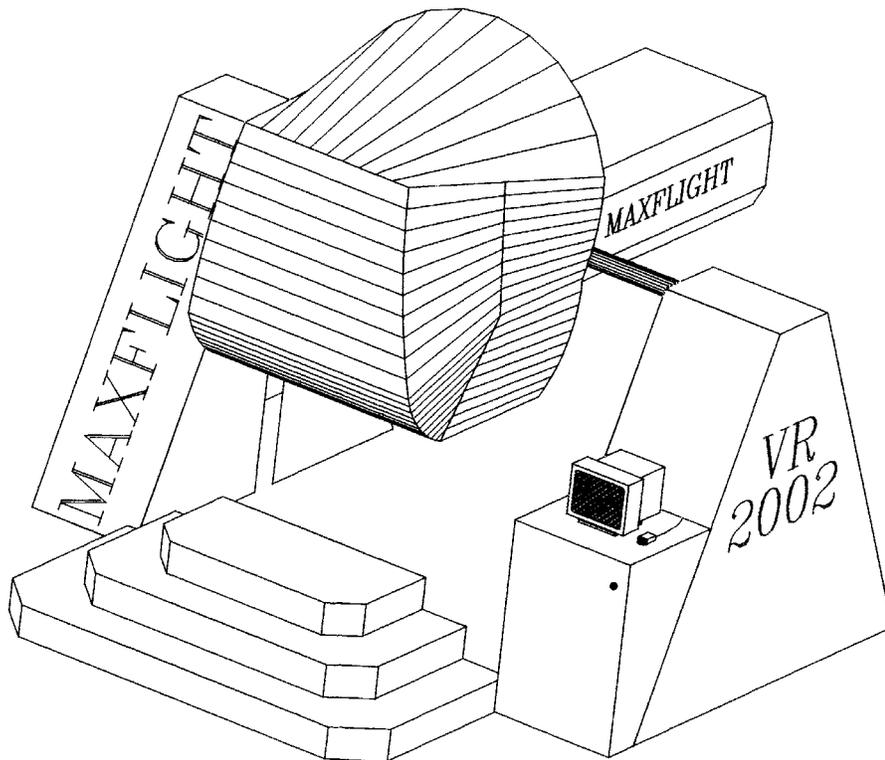
**Ensure the Canopy is closed and locked**

**Pull-up the Hydraulic “E-Stop” switch and depress the  
green Hydraulic start switch**

**Activate the “Raise” icon with the mouse, the unit should start raising in its’ present position**  
**If it does not move, check the “Failsafe Sensor” on the Counterweight Page(Later versions of Software) or Encoder Page (Earlier versions) and make sure it is not disabling the Hydraulics**  
**Once in the raised position, manually level the unit and lower, open canopy and release the patrons.**  
**Call MaxFlight immediately at 1-800-563-1880, ext 300 or for overseas locations: 001-732-942-9898 ext 300.**  
**While awaiting the return call, completely turn the unit off and re-start the unit in accordance with the MaxFlight operating instructions.**

# MaxFlight VR2002

## Technical Manual



# CHAPTER 1 – REQUIRED MAINTENANCE

## **1-1 Daily Pre-Opening Inspections and Checks**

Listed below are several, but not all areas and items that need inspection to ensure proper ride operation. Ensure the operators complete the daily inspections in accordance with the inspection checklist at the end of the operators' manual.

### **1-1A Surge Suppressor**

At the beginning of each day, the surge suppression system must be inspected to ensure proper operation. The system has separate channels, the primary and the secondary. A green light on the suppressor means that the system is operating correctly. If a red light is illuminated, the system has been surged once and has only one level of protection left. This also means that it **MUST BE REPLACED** soon. Two red lights and an audible alarm means that there is **NO PROTECTION** left and the unit must be unplugged until the surge protector is replaced

NOTE: The surge will have come from your facility or your local power supplier.

### **1-1B Start Switch**

This switch activates the Hydraulic System.

### **1-1C Hydraulic Shut-Off Button**

Verify that the Hydraulic Shut-Off Button will disable the hydraulic system. If the shut off button does not disable the hydraulic system, the ride must be repaired prior to any operation for safety concerns.

### **1-1D Cockpit Assembly**

Verify that the cockpit is clean and secure. Inspect the seats and restraint harnesses for operability. Inspect the speaker system mountings and wire connections. Inspect the latch systems to insure that they are working properly.

### **1-1E Canopy Assembly**

Inspect the canopy mounting hinges and verify that the mounting screws are tight. Inspect the screen for cleanliness and verify that it is secured to the framing. Inspect the projector for mounting stability, bulb operation and that the lens is clean. Inspect the gas lifting ram sub-assemblies for signs of fatigue and the mounting systems for tightness.

### **1-1F Tail Boom Cover**

Inspect the Tail Boom Cover for and damage. Verify that the weldment cover plates are in place. Verify that the securing screws are tight.

### **1-1G Platform and Tail Boom Support**

Ensure that the platform has not moved from its designated position. Make sure that the tail boom support has also not moved away from its position.

NOTE: If the tail boom support is not supporting the tail boom when the unit is lowered, the unit will not operate properly.

### **1-1H Torque Arm Assemblies**

Inspect the torque arm retaining bolt for tightness and wire locks. Verify that the retaining rings are secured to the torque arms.

### **1-1I Hydraulic Sub-Assembly**

Turn on the hydraulic pump and allow it to warm up for 10 minutes prior to operation. During this time, complete a visual inspection of the hydraulic system. Check the fluid level in the sight glass, the level should be between the two black lines. Verify that the hose connections are tight and that the hoses have not sustained any damage. Verify that the oil-cooling fan is plugged in.

### **1-1J Panel Fasteners**

Ensure that the plastic fasteners are in place and are securing the panels in place.

### **1-2 Weekly Maintenance**

The following section identifies areas of the equipment that need to be checked on a weekly basis.

#### **1-2A Roll Ring Sub-Assembly**

Inspect the condition of the roll ring sub-assembly. Verify that the slip rings are free of contaminants that would interfere with data transmission. Verify that the hydraulic connections are tight and are not leaking fluid.

#### **1-2B Pitch Ring Sub-Assembly**

Inspect the condition of the pitch ring assembly. Verify that the slip rings are free of contaminants that would interfere with data transmission. Verify that the hydraulic hoses and electrical cables do not bind up during operation. Verify the cable support system is secured to the A-Frame assembly. Lubricate the pitch arm bearings with a lithium lubricant.

#### **1-2C Key Way Sub-Assemblies**

Inspect the keyways for damage and tightness of the bolts. Lubricate the guides with a lithium lubricant.



#### **1-2D Counterweight Sub-Assembly**

Inspect the counterweight system, checking for any condition that would interfere with the proper operation of the counterweight system. Clean and lubricate the counterweight shaft at this time. Inspect the retaining bolt safety wires and the bolts for tightness.

#### **1-2E Electrical System Sub-Assemblies**

Verify that all of the electrical connections are tight. Verify that each of the limit switches operate correctly.

#### **1-2F A-Frame Sub-Assembly**

Verify that the A-Frame assemblies have not moved and that the bolts have not loosened due to vibration.

### **1-3 Lubrication (See lubrication diagram – Page 27)**

#### **1-3A Hydraulic Filter Change**

Initial hydraulic filter change must be accomplished at or about 50 hours of operation. Each additional filter change should be accomplished after each 250 hours of operation. For more information on this procedure, consult the BERENDSEN Hydraulic manual provided with your unit.

#### **1-3B Counterweight Worm Gear**

Lubricate the counterweight worm gear with wheel bearing grease once a month to insure proper operation of the counterweight system.

#### **1-4 Tri-Annual Maintenance**

Oil samples must be submitted to Berendsen/Vickers every four months in order to maintain the warranty of the hydraulic system. **Please follow instructions per the Berendsen Manual found in your ‘Product Information Package’.**

#### **1-5 Annual Maintenance**

The hydraulic pump motor bearings must be greased once a year.

#### **1-6 Extended Periods of Non-Use (6 Months or more)**

If the unit is to be stored or left inoperable for periods in excess of six months be aware of the effects the environment on the equipment. Such things as temperature, humidity, sunlight, oils, solvents, corrosive liquids/gases and insects can affect the systems.

NOTE: The hydraulic filter must be changed prior to start-up and each circuit should be inspected.

#### **1-7 Harsh Environment Conditions**

If conditions exist in which humidity, dust, corrosive materials or any other type of particles that would collect onto or corrode exposed materials in a fashion thereof, then the scheduled maintenance will be required twice as frequent as specified in the current time intervals. A determination of the environment whether it be inside a humid facility or near an exposed opening that moisture can enter or near a dust or dirt collecting area should be examined. Keeping the system properly lubricated and cleaned will aid in the longevity of the system.

## **CHAPTER 2 – OPERATING LIMITATIONS**

### **2-1 Computer**

When starting up the computer system, the operator should observe any error indications or signs that the computer is not functioning correctly. Provided there are no error messages and the game can be initialized, the system should be cycled at least once to ensure that the computer is functioning properly.

### **2-2 Restraint System**

By raising and lowering the restraint harness you will be able to establish that they are operating properly. If any part should fail, the unit should be shut down until the repair is made.

### **2-3 Hydraulics**

The hydraulic E-Stop and Starter Switch will turn the hydraulics on and off, the fan should operate after the temperature reaches 105° F. By completing one cycle without passengers will verify that the hydraulic systems are functioning correctly. Pitch and Roll motors should follow the selected motion that appears on the monitor and careful observation should be taken to ensure the unit returns to the proper home position. Also, the hydraulic fittings and hoses should be free from fluid and all connections should be dry and clean.

## **2-4 Frame and Structure**

A daily inspection of bolts and welds should be accomplished to ensure that there is no metal fatigue or loose bolts. Loose bolts should be tightened in accordance with MaxFlight specifications, however, if there is any question as to why there are loose bolts, the unit should be shut down and examined to determine any causes that are not obvious. It is up to the operator to report these conditions to qualified, on-sight technical personnel only. If there are any stress cracks or cracks in a solid member, the system should be shut down and examined immediately.

## **2-5 Platform**

If at any time there is a question with the stability of the platform, passengers should not be allowed to enter the system until an adequate means of entry into the system is available.

# **CHAPTER 3 – SYSTEMS BRIEF**

## **3-1 Hydraulic System**

The hydraulic system provides the force for the motion of the unit during operation. The motion base is a two-axis system with a lifting ram system for raising the unit to the operating position. Each of the main axes has a hydraulic motor that drives the unit in pitch or roll. The hydraulic fluid, which is under pressure, is controlled by a combination of computer commands sent to the hydraulic valves, based on the required position of the unit as dictated by the game program. The computer program knows the position of the unit by reading the encoders on the pitch and roll axis. The encoders are attached to the rear shaft of each motor/gear box. The encoders are an electrical device, powered by the 24-volt circuit, which measure the position of the units. This is done by sending a light beam through a glass disc that has 2,400 dark and 2,400 light lines on it. Each light or dark line sends a pulse to the computer motion control board that controls the pulses and determines where in pitch or roll the unit is. Further information of this system will be in the electrical system.

In the roll axis, all units have a Heco/Ross combination gear box and hydraulic motor, which allows the cockpit to roll. The hydraulic fluid to operate this motor passes through the roll valve that is located on the hydraulic power unit on the left-hand side on top of the manifold, as you face it from the front. After the control signal comes from the computer through the motion control card it is sent to the Hydraulic Control Valve as a (+ or -) 10V signal based on the direction required. The valve begins to open proportionally based on the size of the signal sent hence the name Proportional Control Valve. The size and + or - nature of the signal will determine how fast the unit rolls and in what direction. This is accomplished inside the valve by a shuttle moving back and forth and opening ports to adjust the flow and direction.

Once the fluid starts to flow from the roll valve, it passes via the hydraulic hose to the hydraulic pitch swivel. The Hydraulic Pitch Swivel is located on the end of the left-hand pitch shaft and has three hoses connected to it. Two of the hoses are for pressure, forward and reverse. The first is marked GREEN and is connected between port "D" of the manifold and P3 of the hydraulic swivel. It then goes via hose through the left-hand pitch shaft to the roll motor located inside the weldment. The second pressure line, marked BLUE, follows the same path from Port "C" of the manifold to part of the hydraulic swivel. The third hose (RED) is not under pressure and is a case drain, connected between the tank and the roll motor located in the weldment.

The pitch valve is located on the pitch motor torque arm, just below the pitch motor. There are two hoses that are connected to the small side ported sub-plate under the valve. One hose marked PURPLE is connected directly between the sub-plate (Port “P”) and the manifold (Port “A”) located on the swivel side, also marked PURPLE. The other hose is marked GREY at both ends and is connected between Port “B1” of the manifold on the swivel side directly to the sub-plate (Port “T”) of the motor side. Also coming from the sub-plate under the pitch valve there are two hoses that go directly up to the pitch motor. These hoses are alternately under pressure depending on the direction the motor is commanded to turn. A third hose which is attached to the top of the motor directly and marked RED is the case drain that provides lubrication to the motor bearings.

**WARNING: If a pressurized line is accidentally connected to this port, the unit will slowly turn until the seals are blown out and oil would be seen leaking from the front or back of the motor.**

The other end of the case drain is attached to the hydraulic unit at one of the return line connections. The hydraulic lift circuit is comprised of two lifting rams located under the pitch shaft bearing blocks. These hoses are connected to the output (front) of the hydraulic flow divider. On the backside of the hydraulic flow divider is the supply and return line, which comes directly from the manifold (Port “F”). One hose, which is attached to the back of the hydraulic flow divider, is the supply and return line. The other two lines are connected to the bottom of the lifting rams. The supply and return hose is connected to the pressure manifold on which is located the up and down pressure valves. These valves are electrically connected to coils that enable and disable the valves sending pressure to lift the rams driving the upward and downward motion of the unit.

NOTE: The lift circuit is fail safe in that it requires hydraulic pressure to function in either the up or down direction, a small spring loaded ball valve in the let down side of the circuit requires hydraulic pressure to move it, allowing decent. This ball valve prevents the unit from descending due to a power failure. The operator should be trained in the emergency procedure to use the emergency let down valve. This valve bypasses the normal operational fluid flow to the cylinders and directs fluids directly back to the tank. The rate at which this occurs depends on how far the valve is moved toward the open position.

**WARNING: The Emergency Let Down Valve should be moved toward the emergency (UP) position SLOWLY, as the machine will immediately start to descend at a rate determined by the opening of this valve.**

### ***3-2 Electrical System***

The Power Distribution Box incorporates the nerve center of the MaxFlight simulators by allowing signals and current to control the unit through its operation. It is a very complex unit that involves the use of 120-volt alternating current, 24-volt direct current and low voltage signal current used to interface with the computer. These power sources are housed inside the power distribution box that is situated on the bottom shelf of the console below the computer. The front of the power distribution box consists of two electrical switches and a circular view window through which the surge protector can be seen and its normal operation will be indicated by a green light.

The power distribution box contains fourteen (14) connectors, namely the main power, auxiliary power, cockpit power, pitch valve, roll valve, counterweight, home sensor,

emergency stop, up/down pressure switch, up/down pressure valve, up sensor, down sensor, pitch encoder and roll encoder numbered in sequence from one (1) to fourteen (14) in the above order.

The main power uses a male, three prong locking Hubbell connector while the auxiliary and cockpit powers use a female, three prong locking connector. The auxiliary provides power to the computer, hydraulics and cockpit power supply, which in turn provides power for the restraint actuator motors, projector and audio amplifier.

The pitch valve and roll valve connections activate the hydraulic pump initiating the specific motions of pitch and roll.

The counterweight is used to balance the cockpit and tail section at their vortex, referred to as the weldment. The balance is obtained by powering a drive motor, located on top of the weldment, which moves the counterweight back and forth on a shaft as required to balance the machine. When the pitch valve no longer senses a load, the unit will rise to its maximum up position.

The home sensor verifies the raised horizontal position from a signal sent to it by a pressure switch.

The emergency stop switch, located on the joystick, activates the emergency stop condition, returning the machine to its original horizontal (Home) position. The machine can then be lowered to the platform by using the raise/lower switch.

The upper and lower limit switches, which are mounted on the center sections of the A-Frames directly in line with the bearing blocks, signal the computer when the machine is in the proper position to begin the game (upper) or load and unload passengers prior to or at the end of the game sequence (lower).

The power distribution box receives its power from the motor starter box, electrical swivels and the computer.

The motor starter box is the main fuse box where source power connections are made. Subsequently, the output lines are timer fused, for short circuit protection and fed into the hydraulic power unit and power distribution box.

The electrical swivels allow current and data signals to flow into the cockpit and associated devices via a series of rotating rings with brushes that make contact and allow roll motion through a range of 360 degrees in either direction.

The hydraulic swivel is connected to the electrical pitch swivel and mounted on the left-hand side of the pitch shaft with input and output connections. The input connections consist of cockpit power feed (120VAC), grounding wire, left/right phono jacks, counterweight motor feed, video feed, emergency stop and a data line to the roll encoder.

These signals are then transferred to the center weldment where the power, phono, video and emergency stop are transferred to the roll electrical swivel and on to the cockpit.

Thus, the unit can be described, from an electrical perspective, as being controlled from the computer and the power distribution box. Internal printed circuit boards allow the power box to communicate with the computer, which is the heart of the unit.

## **CHAPTER 4 – TROUBLESHOOTING & REPAIR**

During the course of operations some problems may develop. This chapter has been designated to assist in the locating and repair of any problem that affects the operation or safety of your simulator. At all times basic troubleshooting procedures will be the most effective method to use. When working on the electrical system always check the proper power is present. When troubleshooting the hydraulic system ensure that the hydraulic accumulator is charged and on line. This chapter has been broken into the following three sections: Electrical, Hydraulic and Computer.

### ***4-1 Electrical***

**4-1A** Check the power supply whenever any problem arises that affects the operation of the simulator. If power lines are connected and switches are on, then check that all of the connectors behind the power distribution box are tight and connected as well as all other connectors on the machine. Vibration of the machine can cause the connectors to loosen causing intermittent errors.

**4-1B** After assembly, a check of the connectors must be made to ensure that all the wires and connectors are correct.

**4-1C** If after checking for power and verifying connectors the problem still exists, please contact your authorized service technician or a service repair manager at MaxFlight.

### ***4-2 Hydraulic***

**4-2A** The hydraulic system should not require any additional maintenance other than ensuring that the fluid level remains at the specified level and the filter is changed in accordance with the Berendsen manual. Should the level of fluid start decreasing, check each of the connectors for leakage and tighten connections. Only qualified service technicians should work on the hydraulic system due to danger posed by the system pressure. Refer to the Berendsen Fluid Power Technician Manual for any problem with the hydraulic system or related equipment.

### **4-3 Computer**

**4-3A** Ensure that the computer is turned on and communicating with the kiosk, if installed. The main problem with the computer system occurs whenever the system is not shut down properly. This will cause the hard disk to become cluttered with fragmented information storage locations. A scan disk check should clear these problems.

**4-3B** The settings for the simulator should not be attempted by anyone except qualified MaxFlight technicians.

### **4-4 Unscheduled Cessation of Operation**

Should at any time any of these systems either A) have a malfunction or significant adjustment, B) a mechanical, electrical or operational modification or C) have environmental conditions that affected the operation of the system it must be documented. After the systems in question are rectified a mandatory test run of at least one cycle without passengers should be accomplished and documented to ensure the safety of the system.

## **CHAPTER 5 – COMPUTER DIAGNOSTIC SCREENS**

### **5-1 Introduction**

This section is designed to provide you with the necessary settings pages to troubleshoot any of our simulators. The setup follows the presentation order of the system manager program. Only the pages that can be altered are listed in this appendix. It has been noted at several locations that the local computer experts have changed settings in order to enhance their riding pleasure only to have unbalanced the system causing failures. The readings displayed within these pages should represent a guideline for your settings only. Always refer to your machines particular original setting records to return your system to an operating condition. **Never change a setting without authorization from the MaxFlight Technical Support Division.**

### **5-2 Layout**

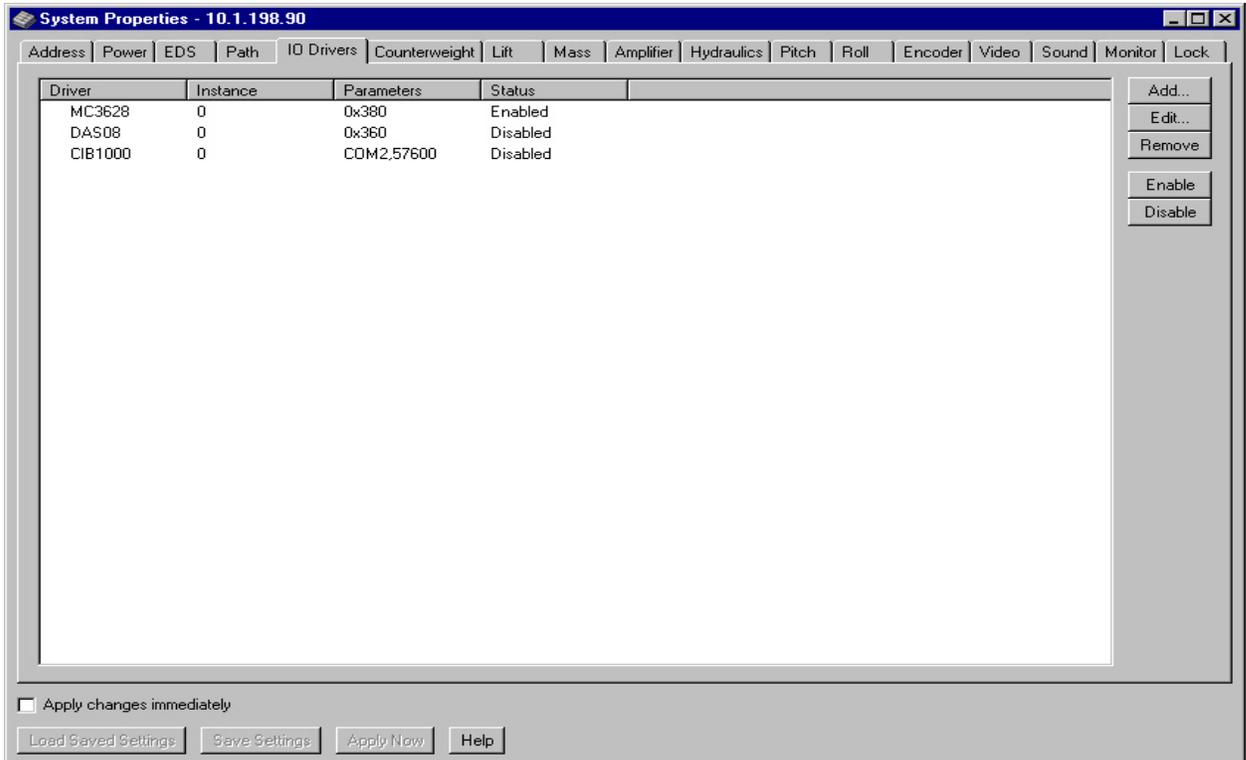
This section focuses on the settings pages required to trouble shoot the system. If a MaxFlight technician has not trained you, do not change any of the settings. The order of presentation is as follows:

- Address
- Power
- EDS
- Path
- IO Drivers
- Motor
- Amplifier
- Lift (1) – Hydraulic
- Lift (2) – Electric
- Counterweight
- Pitch

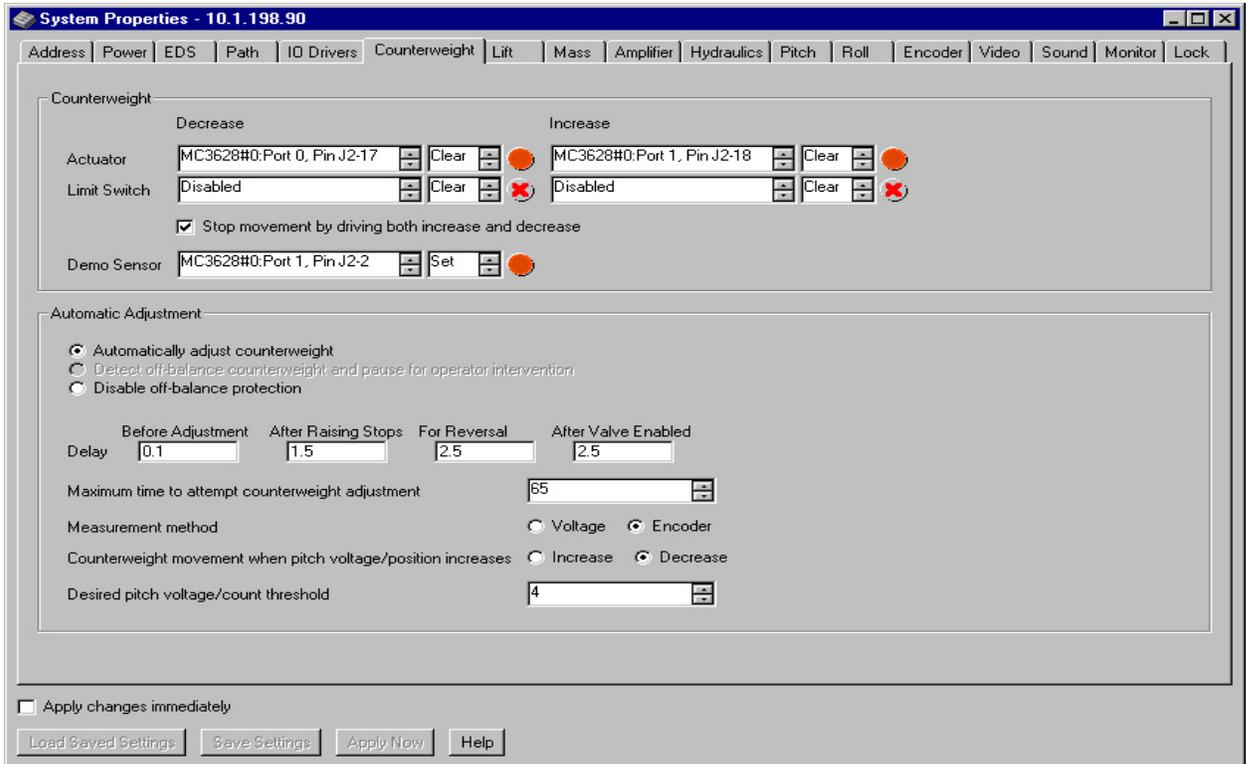
Roll  
Video  
Sound

### 5-3 Troubleshooting

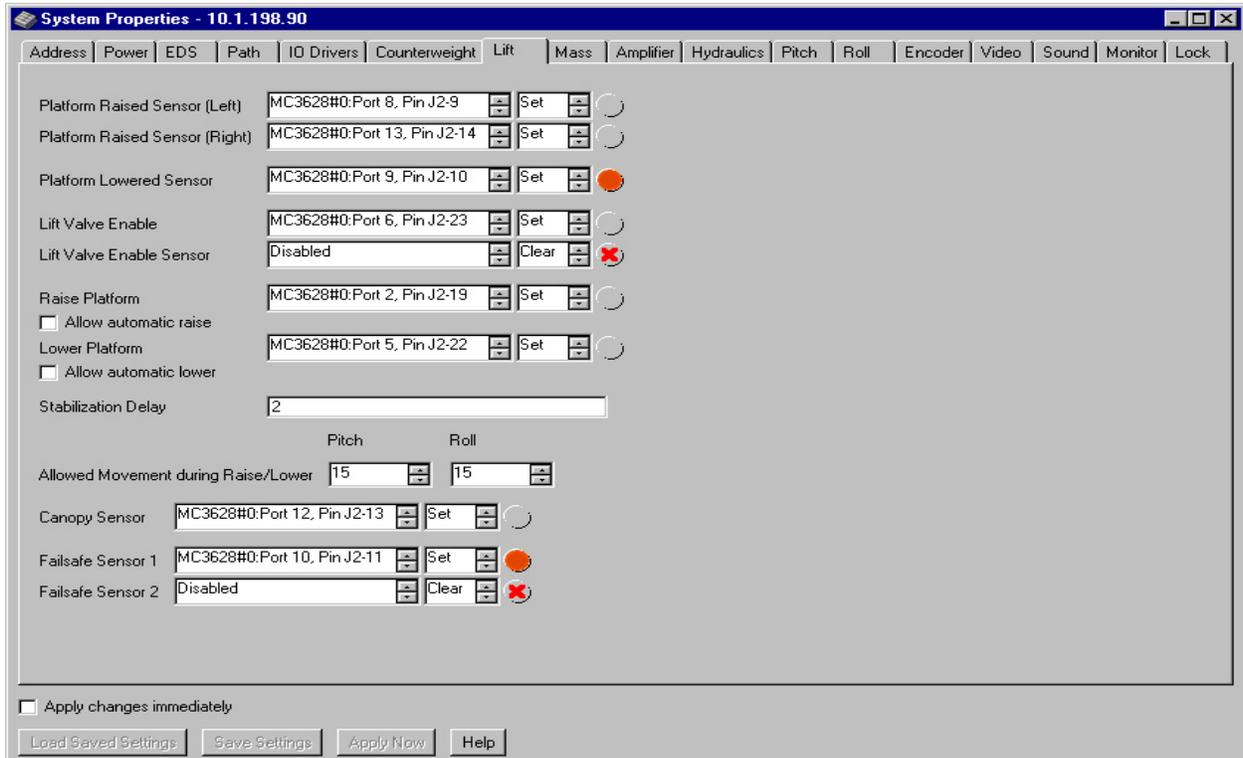
Most problems are not related to the computer settings, they are usually caused by problems such as loose connections, broken wires or hydraulic leaks. The settings pages can assist a trained technician in troubleshooting hardware related problems. The key to isolating a malfunction is to check with the operators as to the operating condition of the machine over the past few days.

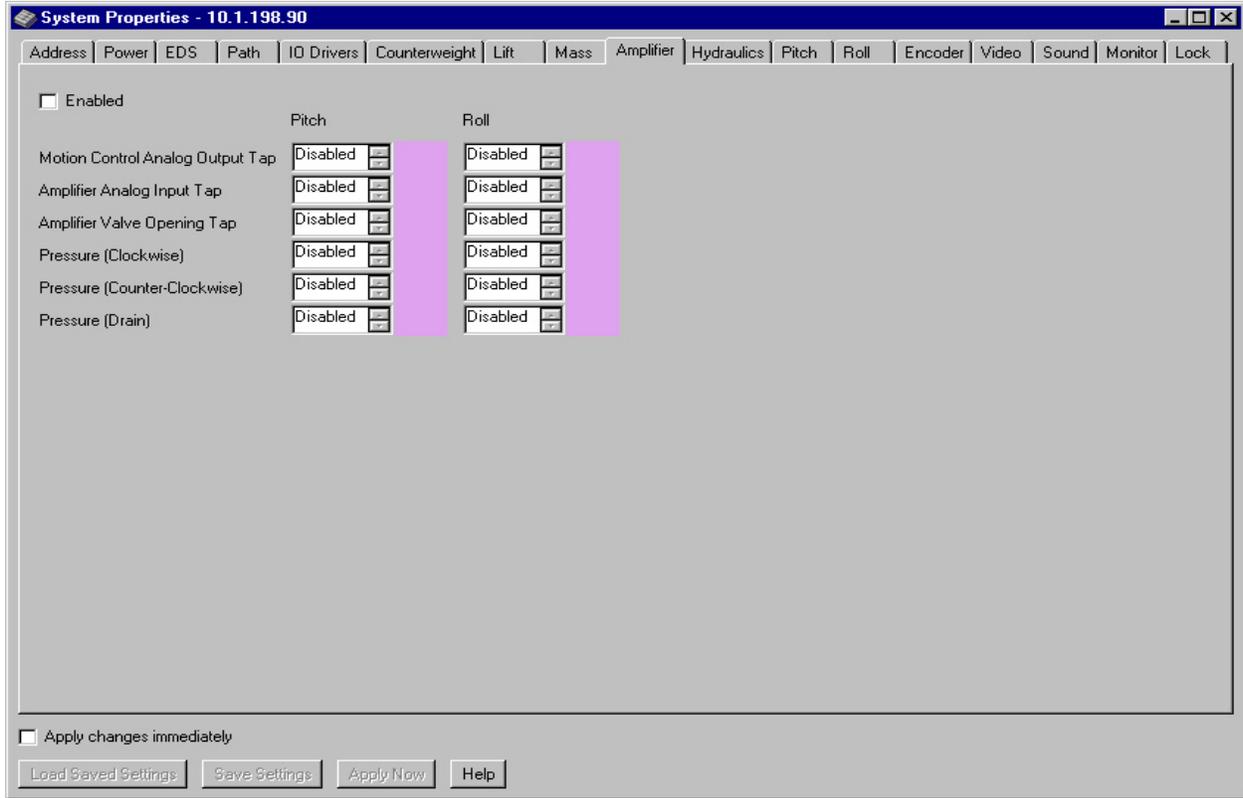


IO Drivers/Counterweight

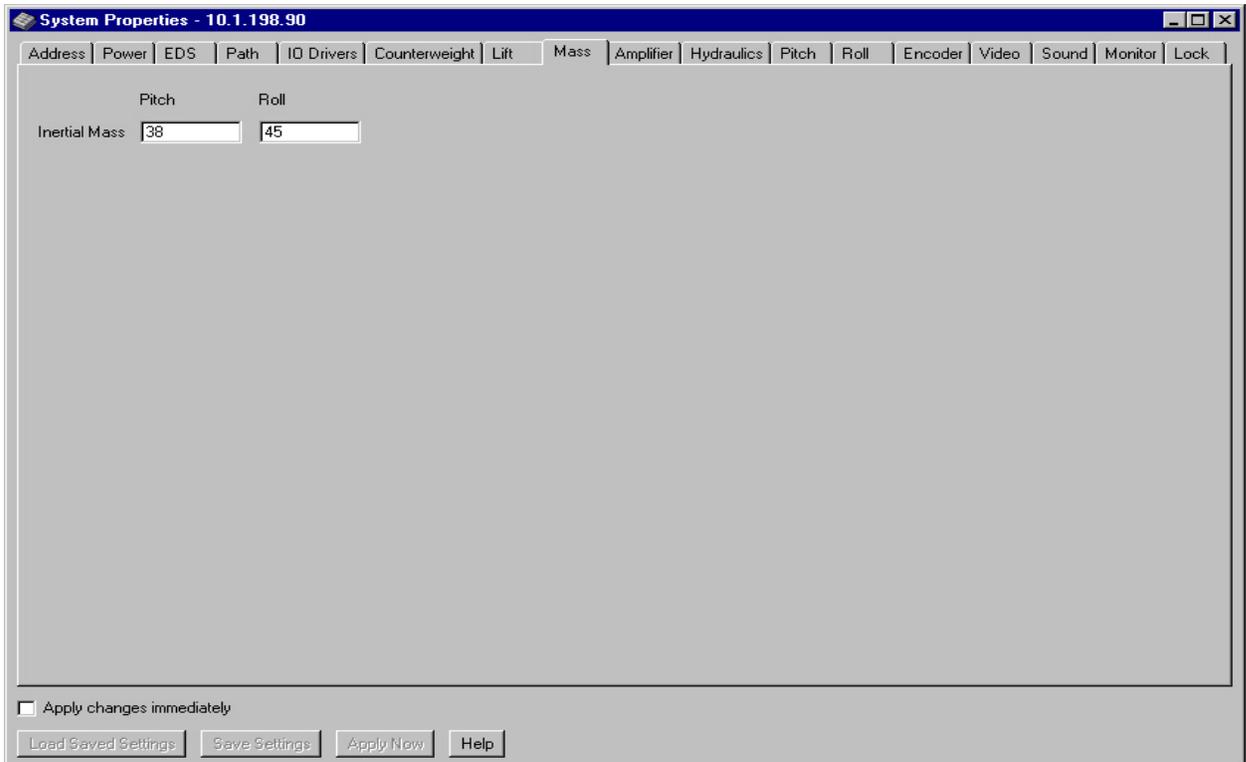


## Lift/Amplifier





## Mass/Hydraulics



**System Properties - 10.1.198.90**

Address | Power | EDS | Path | IO Drivers | Counterweight | Lift | Mass | Amplifier | **Hydraulics** | Pitch | Roll | Encoder | Video | Sound | Monitor | Lock

**Motor**

	Pitch	Roll	
Motor Size	38	13.1	cubic inches
Motor Efficiency	93	93	%
Gear Ratio	1	5.2	

**Pressure**

System Pressure	2000	psi
Pressure Loss	351	psi

**Hydraulic System**

Disable	MC3628#0:Port 3, Pin J2-20	Set	<input type="radio"/>
Valve Power Disable	MC3628#0:Port 4, Pin J2-21	Clear	<input checked="" type="radio"/>

Apply changes immediately

Load Saved Settings | Save Settings | Apply Now | Help

## Pitch/Roll

**System Properties - 10.1.198.90**

Address | Power | EDS | Path | IO Drivers | Counterweight | Lift | Mass | Amplifier | Hydraulics | **Pitch** | Roll | Encoder | Video | Sound | Monitor | Lock

**Filter**

	Position	Hold
Proportional Gain (KP)	18	18
Integration (KI)	1	1
Derivative (KD)	42	42
Integration Limit (IL)	61	61
Sampling Interval	30	30
Error Scale	0	0
Operation Mode	Position	

Apply changes immediately

Load Saved Settings | Save Settings | Apply Now | Help

**System Properties - 10.1.198.90**

Address | Power | EDS | Path | IO Drivers | Counterweight | Lift | Mass | Amplifier | Hydraulics | Pitch | Roll | Encoder | Video | Sound | Monitor | Lock

Filter

	Position	Hold
Proportional Gain (KP)	7	7
Integration (KI)	1	1
Derivative (KD)	6	6
Integration Limit (IL)	12	12
Sampling Interval	30	30
Error Scale	0	0
Operation Mode	Position	

Apply changes immediately

Load Saved Settings | Save Settings | Apply Now | Help

**System Properties - 10.1.198.90**

Address | Power | EDS | Path | IO Drivers | Counterweight | Lift | Mass | Amplifier | Hydraulics | Pitch | Roll | Encoder | Video | Sound | Monitor | Lock

	Pitch	Roll
Counts per revolution	10000	10000

Apply changes immediately

Load Saved Settings | Save Settings | Apply Now | Help

# Sound

System Properties - 10.1.198.90

Address | Power | EDS | Path | IO Drivers | Counterweight | Lift | Mass | Amplifier | Hydraulics | Pitch | Roll | Encoder | Video | Sound | Monitor | Lock

Video Player

Type: Targa 1000 Multimedia Adapter

Switches

Emergency Stop: MC3628#0:Port 0, Pin J2-1 Set

Apply changes immediately

Load Saved Settings | Save Settings | Apply Now | Help

System Properties - 10.1.198.90

Address | Power | EDS | Path | IO Drivers | Counterweight | Lift | Mass | Amplifier | Hydraulics | Pitch | Roll | Encoder | Video | Sound | Monitor | Lock

	Left Channel	Right Channel	Change Together
Output Volume	70	70	<input checked="" type="checkbox"/>
Attractor Volume	50	50	<input checked="" type="checkbox"/>

Apply changes immediately

Load Saved Settings | Save Settings | Apply Now | Help

## CHAPTER 6 – DRAWINGS / SCHEMATICS

### 6-1 Introduction

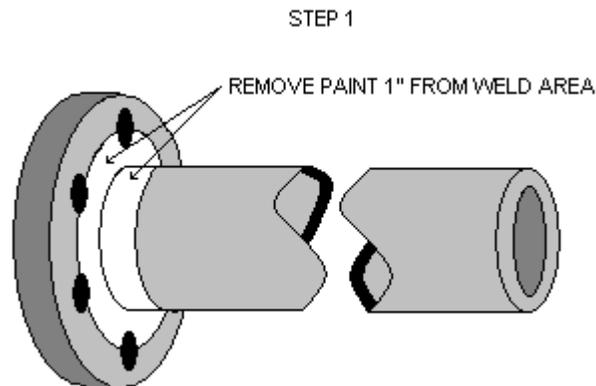
This section contains identification drawings, electrical schematics and all pertinent technical drawings to the VR2002 Cyber Roller Coaster.

Please refer to these drawings during all maintenance.

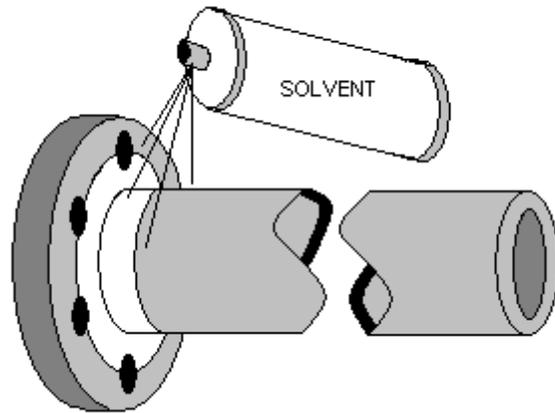
## 6-2 NONDESTRUCTIVE TEST

### 6-2A LIQUID PENETRANT

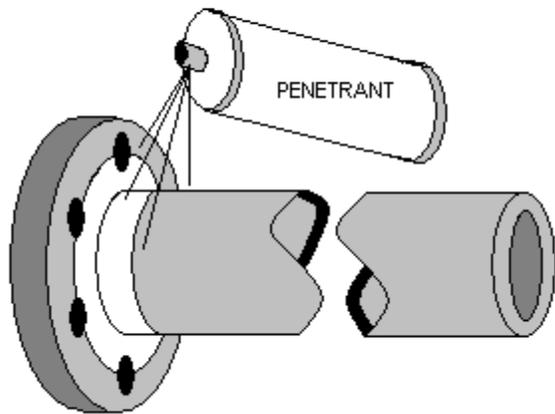
- Remove all paint a minimum of one inch of the weld area.
- Clean area with solvent and allow to dry.
- Apply penetrant to test area allowing ample time to seep into openings.
- Remove penetrant remaining on surface without removing the penetrant from openings.
- Apply developer.
- Visually examine the weld for penetrant indications in the developer coating.
- Once again clean the tested area of developer and any traces of penetrant.



STEP 2

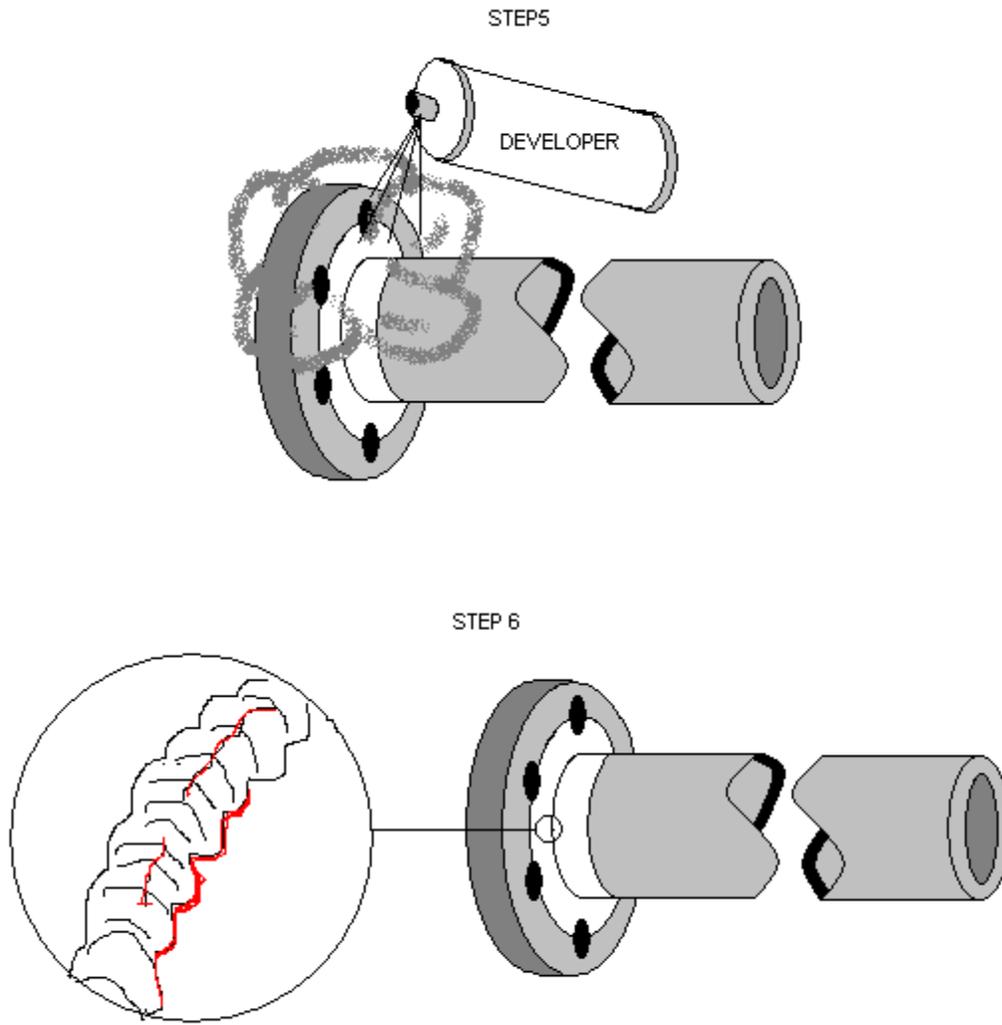


STEP 3



STEP 4





After inspection of all welds clean the remaining penetrant and developer for future inspections.

# **MaxFlight**

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C O R P O R A T I O N

May 9, 2000

**To: Whom it May Concern**

**Subject: MaxFlight VR2002 NDT Requirements**

**The MaxFlight VR2002 Cyber Roller Coaster is required a Non-Destructive-Inspection annually in accordance with the MaxFlight VR2002 Manual. The initial inspection is performed in-shop prior to installation at the site. The next inspection is due one year from date of installation.**

**Richard J. Mascolo  
Technical Support Manager**

**MaxFlight Corporation**  
750 Airport Road ° Lakewood, NJ 08701  
Phone: (732) 942-9898 Fax: (732) 942-1114

VR2002 Weekly Inspection Checklist
------------------------------------

Week Ending: \_\_\_\_\_ Inspected By (print): \_\_\_\_\_  
Signature: \_\_\_\_\_

\* **These sheets must be filled out completely, kept in your records and faxed to MaxFlight (Attn: Tech. Support) on a weekly basis.**

- Inspect the Roll ERC (Electrical Rotary Contact) and pins for proper security and condition
- Clean the projector fans and lens (**DO NOT USE LIQUID CLEANER**)
- Inspect all connections on the Power Distribution Box for security
- Inspect the Pitch ERC and Torque Arm for proper security and condition
- Inspect the counterweight shaft, worm gear and guide rail for any apparent wear, damage, or binding
- Inspect left and right key-way bolts (both A-Frames) for security
- Inspect the Up/Down, Canopy and Failsafe Sensors for security and proper operation
- Inspect the A-Frames for signs of “walking” if unit is not secured to floor
- Inspect Harnesses for any weld cracks
- Inspect safety-wired and visible bolts for security
- Ensure the Daily AM and PM inspections have been complied with for the past week(See Operators Manual)
- Lubricate the unit in accordance with the Lubrication Diagram(page 27 of Technical Manual)
- Inspect the Flange welds of the Right/Left Pitch Shafts and Counterweight Shaft at the center weldment to insure there are no cracks, also inspect the safetywire and bolts for security.
- Check the security of both Pitch and Roll Encoders, ensure the set screws are tight.

**GAME LOG READING**

Normal: \_\_\_\_\_

Hours: \_\_\_\_\_

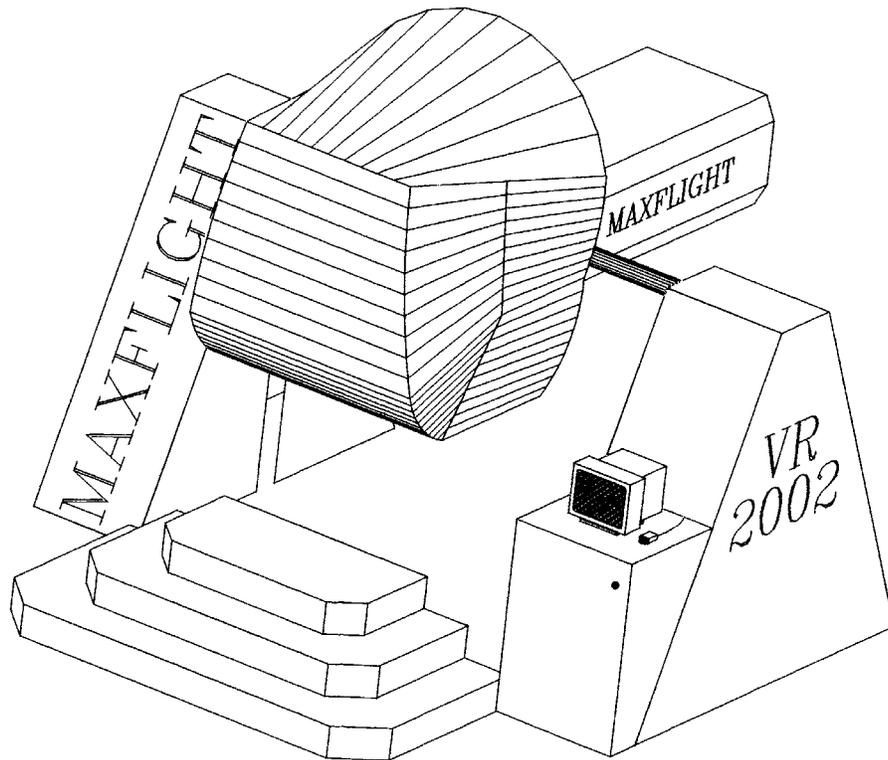
Annotate any discrepancies from previous week and corrective actions

\_\_\_\_\_

\_\_\_\_\_

# MaxFlight VR2002

## Installation Manual



## CHAPTER 1 – SET UP

The first thing to do is to check all of the crates according to the packing slip to ensure that everything has been delivered. Next, identify each crate as to its contents. The packing slip is written out by crate or carton to help you find the proper components that will be needed for set up. It will take two or more people to assemble properly and safely.

### **1-1 Field Torque Procedure**

MaxFlight recommends using the Turn-of-the-Nut procedure for all bolts.

Turn-of-the-nut tightening process encompasses a low initial “threshold” torque to achieve “snug nut” condition followed by a prescribed amount of nut/bolt turning to develop the required pre-load. Nut/bolt rotation through a prescribed amount eliminates the influence of all friction variables relative to final accuracies. A one half turn from snug tight on a bolt having a grip length of less than 8 inches will induce pre-load equal to or slightly over the bolts’ rated proof load. For bolts greater than 8 inches, two-thirds of a turn beyond snug tight is recommended.

### **1-2 Assembly Instructions**

**1-2A** Locate the crates containing the A-Frame assemblies. Uncrate the A-frame (s) and seek out the center section weldments. Lay out all of the other pieces to ensure everything is there.

**1-2B** Locate the ½”-13 x 1” bolts and lock washers, 16 of each for each A-Frame. The 30” C-Channel can be loosely bolted to the bottom of the center weldment and to the feet. Then loosely bolt the longer C-Channel to the feet and to the top of the center weldment. See reference drawing number EDA-001.

**1-2C** Stand the A-Frame up and have someone hold it while a string line is stretched across the bottom of the A-Frame to ensure that they are assembled in a straight line. After straightening (if needed), tighten all of the bolts on the A-Frame. Repeat for the other A-Frame. See reference drawing EDA-002. Check that the floor is level then level the center welded section.

**1-2D** Locate the ABS panels for the inside of the A-Frames and their fasteners and attach to the A-Frames. See reference drawing EDA-003.

**1-2E** Lay down the A-Frames across from one another with the holes for the lateral stabilizer brackets to the outside.

**1-2F** Find the center mainframe assembly with the cockpit, uncrate and roll into position between the A-Frames.

**1-2G** Locate the pitch arm assemblies and their bolts. Stand up the A-Frames and have someone hold them. Pay attention to how the units will be facing to ensure the arms are being installed on the appropriate side. Bolt the pitch arms to the center weldment of the main frame. See reference drawing EDA-004/EDA-005.

**1-2H** Safety wire-tie bolts on the pitch arm.

**1-2I** Elevate the main frame using the transport/raising dolly. See reference drawing number EDA-006.

**1-2J** Locate the hydraulic lifting pistons, the piston brackets, the centering brackets for the bottom and the appropriate fasteners.

**1-2K** Insert the piston through the hole at the bottom of the A-Frame center weldment. Bolt the piston bracket to the A-Frame. Then place the u-bolt around the piston and through the bracket. Bolt the centering brackets on the base of the piston. Install the hydraulic extension fitting in the bottom of the lifting ram. Lower the main frame down on top of the pistons. See reference drawing number EDA-007.

**1-2L** Stand up the A-Frames and slide them into the pitch shafts. Ensure that the thrust rings are on the shafts loosely prior to application of the A-Frames. See reference drawing number EDA-006.

**1-2M** Locate the Hydraulic Swivel and Thrust Ring. Install the thrust ring; insert hoses and electrical lines into the Pitch Shaft. Feed the hydraulic lines and the electrical harness into the center weldment. Connections are color coded for ease of installation. See reference drawing number EDA-008.

**1-2N** Locate and install Pitch Motor with the Torque Arm and Locking Ring. See reference drawing number EDA-109.

**1-2O** Make the hydraulic and electrical connections inside and on top of the center weldment. All connections are color coordinated.

**1-2P** Locate the encoders, their brackets and their fasteners. Insert the encoder into the back of each motor, the Pitch and Roll Motor. Be very careful with the encoder, there is a glass plate inside which can shatter. Be sure to leave at least 1/16" clearance between the motor shaft and the encoder. Tighten the setscrew in the side of the motor shaft onto the encoder shaft. Position the bracket over one of the threaded holes in the back of the motor. Line up the slot in the bracket with the stud on the encoder and tighten bracket bolt. See reference drawing number EDA-109.

**1-2Q** At this time the unit(s) can be initially squared up. This will need to be redone upon completion of assembly. See reference drawing number EDA-010.

#### SQUARING THE UNIT

Locate the keyways, inside of the weldment on the A-Frames. Using the laser level, from the top and center of the right keyway, shoot a beam across to the left A-Frame keyway. The beam should be centered on the left keyway. This will ensure the unit is square.

**1-2R** Locate the lateral stabilization frames, bolt into place and lower leveling bolt. See reference drawing number EDA-111.

**1-2S** The unit can now be mounted to the floor. This is done to prevent the unit from moving.

NOTE: The A-Frames will be anchored to the floor using (4) ½” x 5-1/2” Grade 5 Wedge Anchors each,  
one (1) in each A-Frame assembly foot.

**1-2T** At this time have someone go to the front of the cockpit and hold down on the footrest to counterbalance the unit. Retrieve the tail boom cover and slide over the tail section allowing the half-moon cut outs in the cover to slide over the pitch arms. Secure the tail cover from underneath with the knobs. Move the stand under the tail between knobs and allow tail to rest on the stand. See reference drawing number EDA-112.

NOTE: The tail boom stand will be anchored to the floor with (4) 3/8” x 2-1/4” Grade 5 Wedge Anchors.

**1-2U** Locate the ABS concealment panel that sits on top of the main frame cross block and install. See reference drawing EDA-013.

**1-2V** The fiberglass cockpit cover can be installed next. With two people carrying the cockpit, have a third person guide the cockpit and secure the frame to the brackets. Ensure that the cockpit seats all the way to the back. Connect the Occupant Panic Switch. See reference drawing number EDA-114.

**1-2W** Locate the lower rear enclosure panels and fasteners, plug the fans into the power strip. Now hold the panel up into place ensuring all cabling is secure and away from fans. Fasten panel into place. See reference drawing number EDA-115.

**1-2X** Locate the upper rear enclosure panels and fasteners. Fasten panel into place. See reference drawing number EDA-116.

**1-2Y** Locate the loading platform and uncrate. Unscrew the support ribs from packing position and screw ribs into place where marked. Locate the dowel pins, insert into the holes on the two lower levels and assemble the tiers. Slide into place under the cockpit. See reference drawing number EDA-117.

NOTE: The steps will be anchored to the floor with (4) 3/8” x 2-1/4” Grade 5 Wedge Anchors, one (1) in  
each corner.

**1-2Z** Locate the hydraulic pump, uncrate and fill with clean, filtered hydraulic fluid. Fill to the TOP of the sight glass. DO NOT OVERFILL.



NOTE: The fluid should reach approximately  $\frac{1}{4}$ " from the top of the sight glass.

**1-2aa** Roll the pump into place with radiator fins on the outside next to the louvers on the cabinetry. Save all hose, line and port plugs for future use. See reference drawing number EDA-118.

**1-2bb** Locate the hydraulic lines and lay out for identification. Refer to the hydraulic hose schematic for location and placement. All hoses are color-coded. Make all remaining connections.

**1-2cc** Locate the wire harnesses and lay out for identification. Run the long harness from the electrical cabinet around the back of the machine to the encoder and the valve coil. Wire tie lines together.

**1-2dd** Uncrate the cabinetry and begin assembling the sides of the A-Frame covers by loosely bolting them to the A-Frames. Then slide the top section into place and fasten with screws (both sides). After the tops are fastened, the sides can be tightened onto the A-Frame. See reference drawing number EDA-119.

**1-2ee** Make electrical connection. See reference drawing number EDA-119.

**1-2ff** Locate the computer stand and uncrate. Fasten the stand to the cover on the hydraulic/electrical swivel side in front. Feed the electrical lines into the stand and fasten to cabinet. See reference drawing number EDA-120.

**1-2gg** Make the hydraulic swivel connections and the valve coil connections on the back of the electrical cabinet in the podium. They are all color-coded.

**1-2hh** Locate the ground station computer and uncrate. Place the computer cabinet inside computer stand on the shelf. Plug into the power strip.

**1-2ii** Uncrate the monitor and keyboard and place on top of the computer stand. Locate the cabling and connect the monitor and keyboard to the computer cabinet. Feed cabling through the hole provided in the top of stand.

**1-2jj** Make the other connections to the computer coming from the electrical cabinet.

**1-2kk** Locate the projector and uncrate. Install the projector on the projector mount. Make the cable connections. Clean lens if necessary.

**1-2ll** Trapped air will cause a squealing noise; therefore, the system must be purged of the trapped air in the lines. Purge air from the lift circuit by venting the system into a container until the fluid is free of bubbles. This should not exceed 45 seconds.

NOTE: Allow the oil to heat up for approximately 10 minutes prior to testing the pressure of the hydraulic fluid.

System Operating Pressure: The hydraulic system operates at approximately 2000 PSI.

Hydraulic Lift Circuit: The hydraulic lift circuit operates at approximately 1200 PSI.

**1-2mm** Install face panels on the ends of the cabinetry. See reference drawing number EDA-121.

**1-2nn** Place the chase way, over the hoses and cabling, that are between the A-Frames at the back .

## **APPENDIX B**

### **INSTALLATION AND PERFORMANCE TESTING CHECKLIST**

#### **1. PASSENGER SEATING AREAS**

- Check the condition of the cockpit unit for fiberglass body damage or deterioration.
- Visually inspect the cockpit unit for loose or missing fasteners.
- Visually inspect the seat unit for damage, deterioration and security.
- Visually inspect for sharp or protruding objects in the passenger areas.
- Check the condition of the floor surface and mats.
- Inspect the lap belts (primary restraint) and related operating mechanisms for proper function, damage and the security of mounting fasteners.
- Inspect the overhead restraints (secondary restraint) for proper function and condition.
- Inspect the steps and thresholds for damage or tripping hazards.
- Check the cockpit door hinges and gas spring cylinders for condition and proper operation.
- Inspect the seat for loose or missing fasteners and appropriate safety wire.
- Inspect the cockpit frame for cracks or deformation.

#### **2. Frame and Base**

- Visually inspect all structural members on the tail boom, A-Frame and the cockpit attachment point for bent/deformed brackets, cracks or damage in the frame members or weldments.
- Check the frame fasteners for appropriate grade, retaining wire and proper installation.
- Check the counterweight and rail for condition and security.
- Check for loose or missing fasteners on the A-Frame and structure.
- Visually inspect the anchor points and verify that the A-Frame has not moved.
- Check for abnormal wear or contact between structural components.
- Visually inspect pivot points and joints for obvious wear.
- Check the frame and base for excessive dust buildup and debris.

- ❑ Inspect the tail boom shroud for security.
- ❑ Check the pine tree fasteners in the A-Frame panels for security.
- ❑ Inspect the roll ring system for wear and security.
- ❑ Inspect the pitch ring and torque arm for security and wear.

### **3. Projection and Audio Equipment**

- ❑ Visually inspect the projection equipment and speaker mounting fasteners.
- ❑ Check the fans and ducting for condition and security.
- ❑ Check the projector for proper operation, cleanliness and security.
- ❑ Check speakers and audio equipment for security and proper functioning.
- ❑ Check the projection controls for proper operation.
- ❑ Check the projection screen for proper mounting, cleanliness and security.

### **4. Hydraulic System**

- ❑ Check for evidence of hydraulic oil leakage.
- ❑ Check for appropriate reservoir fluid level.
- ❑ Inspect the Hydraulic Power Unit (HPU) for obvious damage and deterioration.
- ❑ Test the HPU for proper functioning taking note of any abnormal noise, heat, vibration, or any sign of abnormal condition.
- ❑ Visually inspect the motor and pump.
- ❑ Check the security of the hydraulic lines, fittings and connections.
- ❑ Test the control systems for proper operation.
- ❑ Inspect the hydraulic hoses for signs of deterioration or chaffing.
- ❑ Inspect the rotating union for evidence of leakage.
- ❑ Check the operating temperature of the hydraulic oil during normal operation.
- ❑ Check the oil cooler for condition and mounting security.
- ❑ Inspect the HPU safety guards and warning signs.
- ❑ Inspect the pressure gages and sight glass. The system operates at approximately 2000 PSI and the lift circuit operates at approximately 1200 PSI.
- ❑ Check the oil filter for proper maintenance. (Replace after first 50 hours and then at 250 hour intervals)
- ❑ Inspect the lift cylinders for condition and proper operation.

## **5. Electrical Equipment**

- ❑ Check the ride related distribution equipment.
- ❑ Check for proper use of GFCI's and grounding.
- ❑ Visually inspect the lighting for proper operation and damage protection.
- ❑ Visually inspect the condition of the conduit, wiring and connections.
- ❑ Check for proper condition, operation and labeling of control stations.
- ❑ Check for accessibility for authorized personnel and guarding against guest access.
- ❑ Check for proper operation of the control system in the normal operation mode.
- ❑ Check the monitor and keyboard for normal operation and condition.
- ❑ Inspect the electrical safety guards and warning signs.
- ❑ Check the electrical connections on the control box for security.
- ❑ Verify the proper operation of the limit switches. (2 up, 1 down, 1 canopy and failsafe 1[home positioning sensor] )
- ❑ Check the condition of the slip rings.
- ❑ Check the surge suppressor for proper operation (green light).

## **6. Operational Tests**

- ❑ Test the emergency stop button at the operator console and the Occupant Panic Switch inside the cockpit.
- ❑ Test the operation console controls (CPU menu driven) for proper operation. During start-up check for any error indications or signs that the computer is not functioning correctly.
- ❑ Test the Main and Cockpit switches for proper operation.
- ❑ Test the operation of the fire alarm interface (alarm should indicate E-stop mode, if installed).
- ❑ Test the raise and balance functions.
- ❑ Test the door interlock switch (Canopy Open Sensor) for proper operation.
- ❑ Test the house lighting for correct operation.
- ❑ Test the manual quick release of the harness.
- ❑ Check the harness release lever for proper operation.
- ❑ Check the computer diagnostic functions.

## **7. Safety Systems and Devices**

- ❑ Check for proper operation of the emergency lighting and battery packs.
- ❑ Check the condition, content and location of all warning and information signs.
- ❑ Check for classical hazard guarding in the guest areas.
- ❑ Check the fire extinguishers for condition and location.
- ❑ Visually check the lap belt for damage and deterioration.
- ❑ Visually check the shoulder restraint harness for damage and deterioration.
- ❑ Review the passenger restrictions for compliance to the manufacturer's recommendations.
- ❑ Check the building fire alarm system for activation devices and audible alarms in the ride area.
- ❑ Check the evacuation routes for proper clearances and accessibility.

## **8. Queue and Holding Areas**

- ❑ Visually inspect the queue, walls and fencing for security and damage.
- ❑ Visually inspect the holding areas and pre-show areas for hazards to guests.
- ❑ Check for proper queuing techniques.
- ❑ Check for adequate lighting in the guest traffic areas.
- ❑ Visually inspect for slip, trip and fall hazards in the queue area.
- ❑ Check for sharp or protruding objects in or around the queue area.
- ❑ Check the condition, content and location of all signs.
- ❑ Check the condition and security of the stairs/platform.

## **9. Building Fire Alarm Interface (If installed)**

The VR2002 is equipped with an Occupants Panic Stop capability, which is used to stop the ride at the occupants' request. The circuit is paralleled into the NO contact of the fire alarm system. In case of a fire, the facility's fire alarm system will trip, closing the NO contact, thereby initiating the "Panic Stop" circuit. Upon circuit activation, the system will return to the "Home" position, the video image will freeze and the sound will stop. If power remains, the platform will be lowered to the platform using the normal operating procedure. If power fails, the system will be lowered to the platform using the "without power" procedure as described on Page 4 of the Operators Manual in Paragraph 2-12B. Also, upon lowering the unit to the platform, the attendant will manually release the hood and manually release the restraint harness by removing the hold pin and manually raise the harness off of the patron. This procedure requires approximately 30 seconds.

## **Section IV Drawings**

### 1. Electrical

## **Electrical Drawings ;**

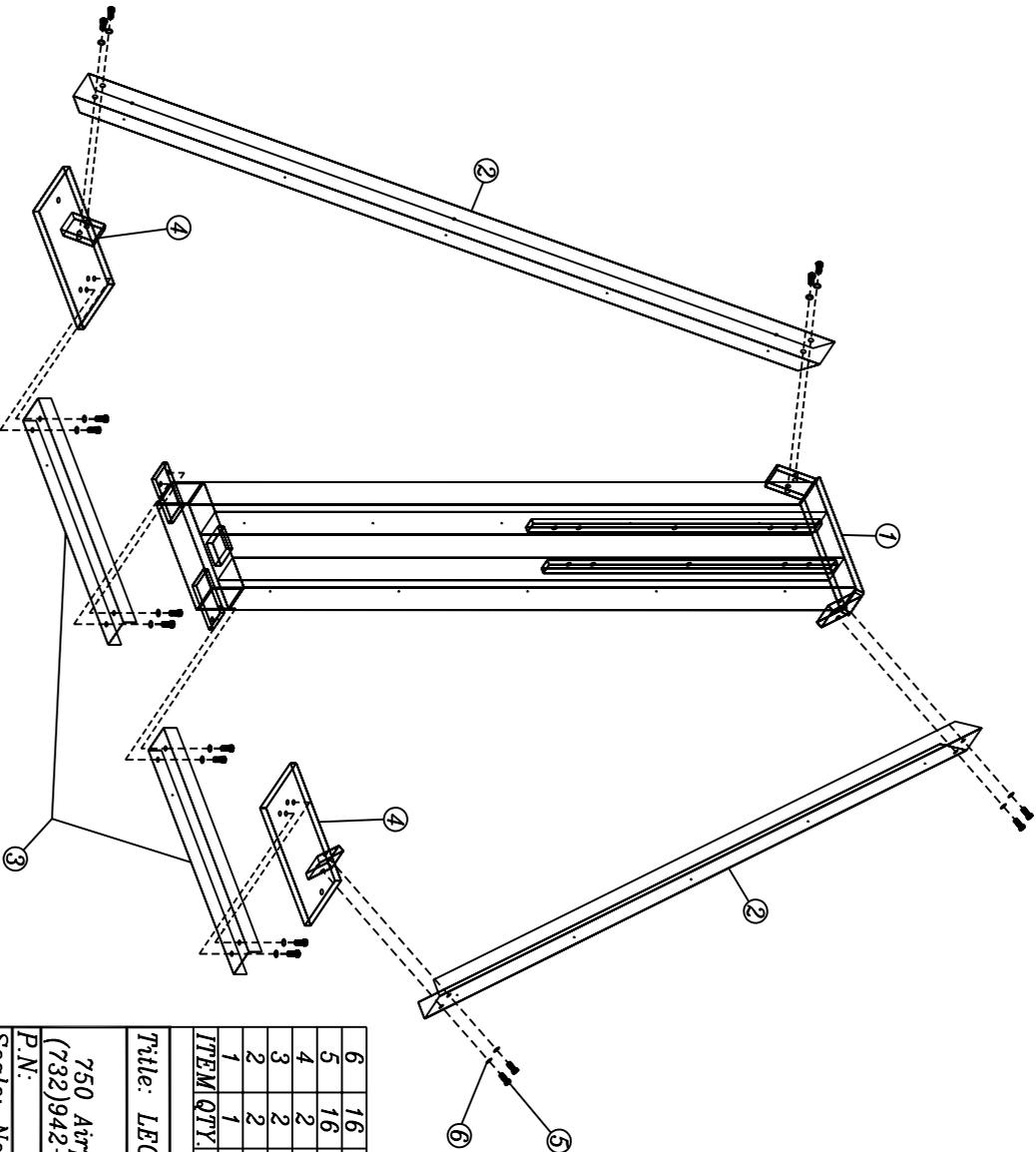
**See Drawings Folder,**

**Locate Current Hyd. Elect Drawings**

**Read Drawings Index**

**Find Drawing needed**

## 2. Mechanical



ITEM	QTY.	DESCRIPTION(PART NO.)
6	16	1/2" LOCK WASHER
5	16	1/2" - 13 x 1" BOLT
4	2	A-FRAME FOOT
3	2	A-FRAME BASE CHANNEL
2	2	A-FRAME CHANNEL(TL, TR)
1	1	A-FRAME CENTER WELDMENT

**PARTS LIST**

Title: LEG ASSEMBLY

MaxFlight Corp.

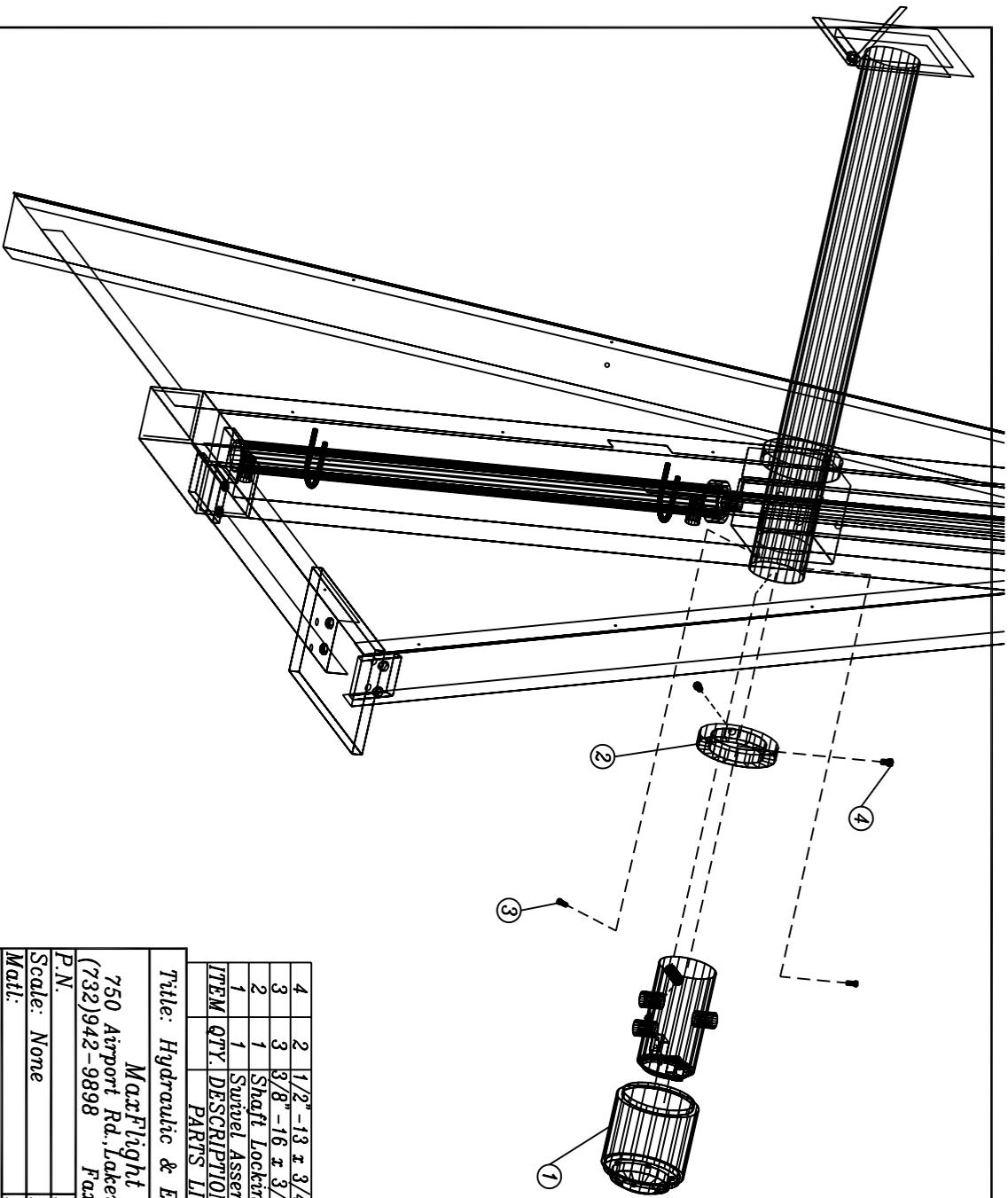
750 Airport Rd., Lakewood, N.J. 08701  
 (732)942-9898 Fax: (732)942-1114

P.N.: Dwg: EDA-001

Scale: None Dwn By: R.P.J.

Mail: Date: 07-15-97

Approved By: Date:



ITEM	QTY.	DESCRIPTION(PART NO.)
4	2	1/2" - 13 x 3/4" Set Screw
3	3	3/8" - 16 x 3/4" Allen Head Bolt
2	1	Shaft Locking Ring
1	1	Swivel Assembly
PARTS LIST		

Title: Hydraulic & Electric Swivels

MaxFlight Corp.

750 Airport Rd. Lakewood, N.J. 08701

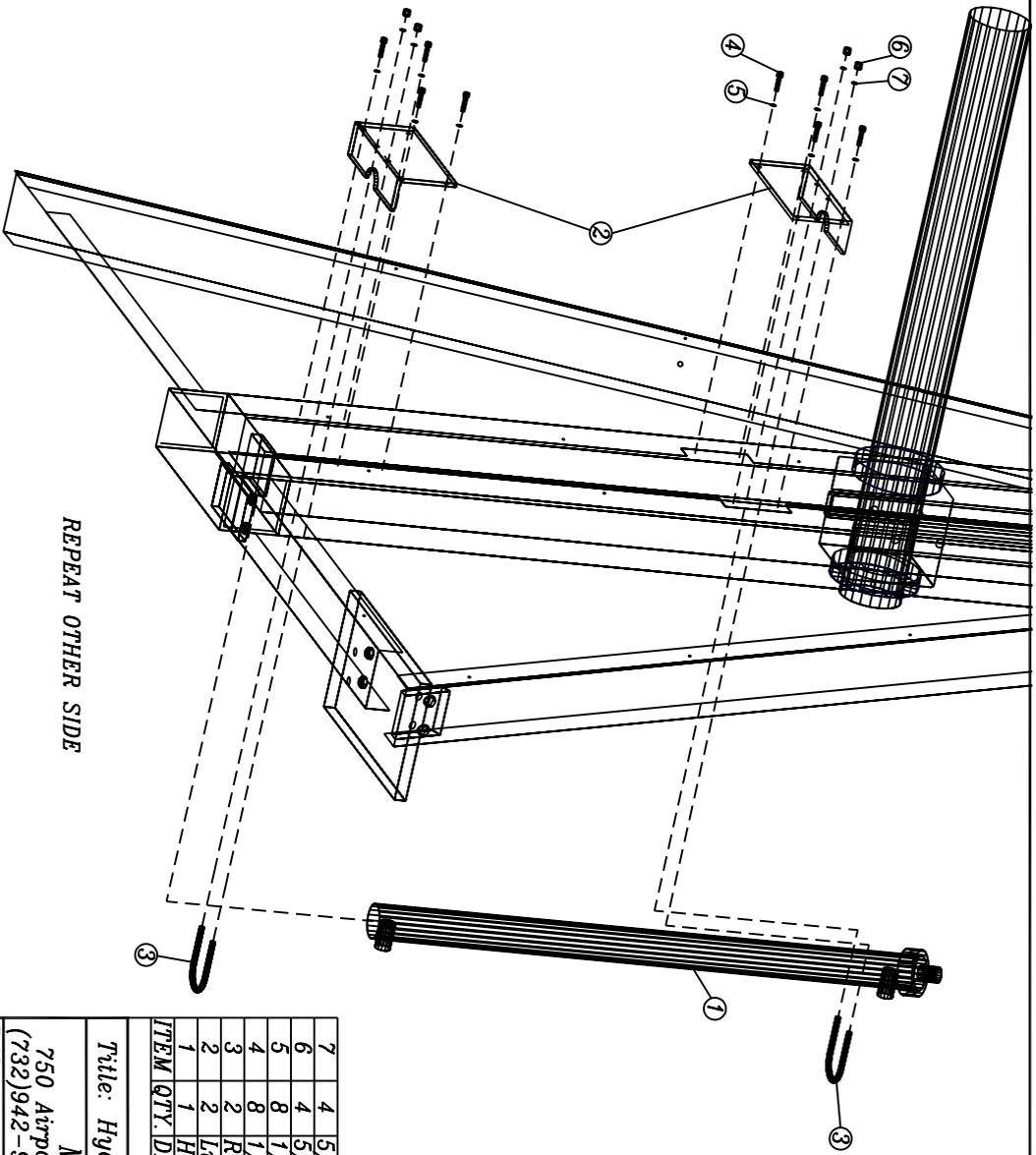
(732)942-9898 Fax: (732)942-1114

P.N. Dwg: EDA-008

Scale: None Dwn By: R.P.J.

Matl: Date: 07-21-97

Approved: Date:



REPEAT OTHER SIDE

ITEM	QTY.	DESCRIPTION(PART NO.)
1	1	Hydraulic Ram
2	2	Lifting Piston Brackets(A5-002)
3	2	Ram U-Bolts
4	8	1/4" x 20 x 1 Allen Head Bolt
5	8	1/4" Lock Washers
6	4	5/16" Nut
7	4	5/16" Lock Washers

PARTS LIST

Title: Hydraulic Lift Pistons

MacFlight Corp.

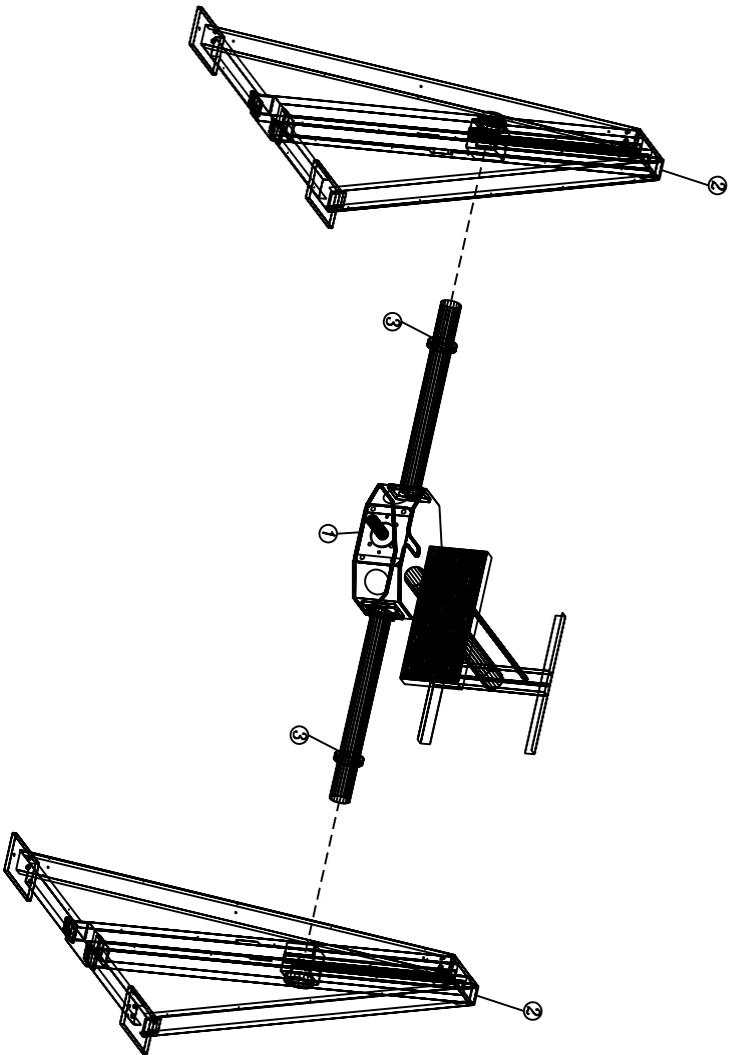
750 Airport Rd. Lakewood, N.J. 08701  
 (732) 942-9898 Fax: (732) 942-1114

P.N. Dwg: EDA-007

Scale: None Dwn By: R.P.J.

Mail: Date: 07-21-97

Approved: Date:



SEAT FRAME & CANOPY REMOVED FOR CLARITY

3	2	Thrust Rings
2	2	A-Frame
1	1	Center Weldment
ITEM	QTY.	DESCRIPTION(PART NO.)
PARTS LIST		

Title: A-Frames To Main Frame

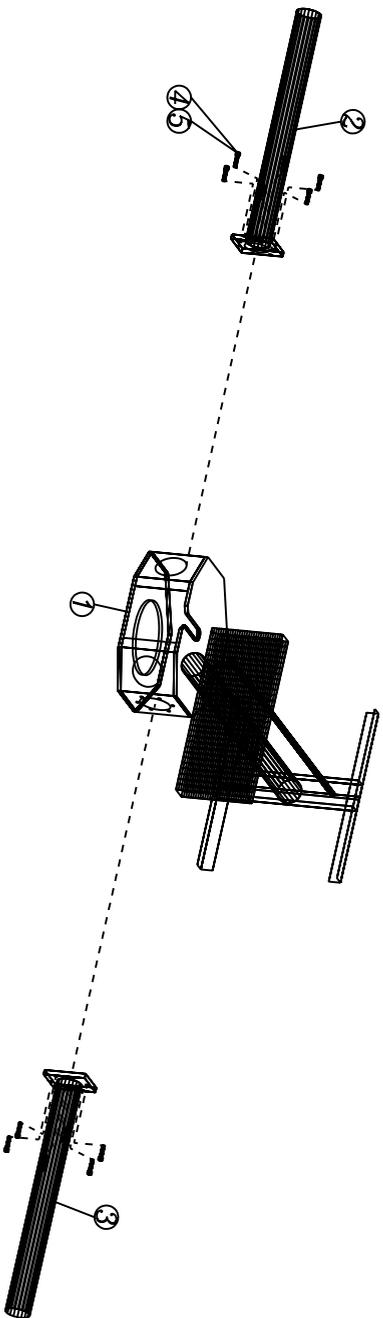
MaxFlight Corp.

750 Airport Rd. Lakewood, N.J. 08701  
 (732)942-9898 Fax: (732)942-1114

P.N. Dwg: EDA-006

Scale: None Dwn. By: R.P.J.  
 Mail: Date: 07-16-97





Seat Frame & Canopy Removed For Clarity

ITEM QTY.	DESCRIPTION/PART NO.
5	12 5/8" Lock Washer
4	12 5/8-18 x 2 Allen Head Bolt
3	1 Swivel Shaft
2	1 Motor Shaft
1	1 Main Frame
PARTS LIST	

Title: Shafts/Main Frame

MaxFlight Corp.

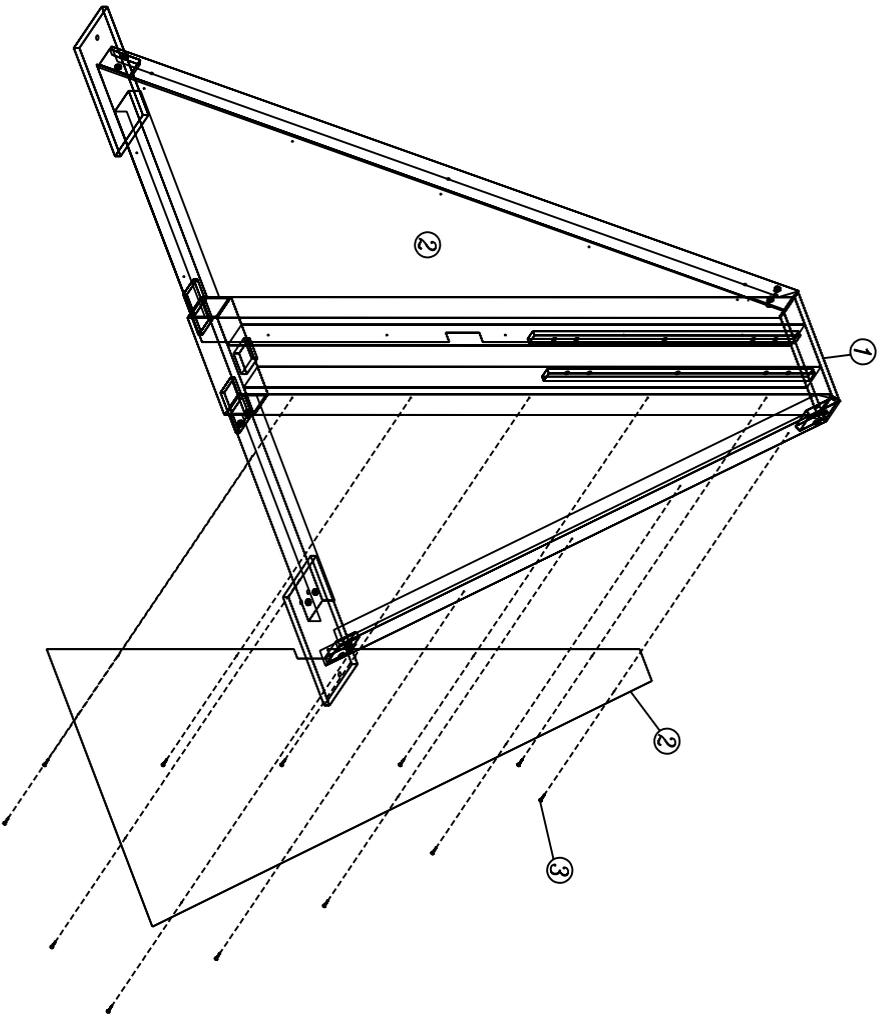
750 Airport Rd., Lakewood, N.J. 08701  
 (732)942-9898 Fax: (732)942-1114

P.N.: Dwg: EDA-004

Scale: None Dwn By: R.P.J.

Matl: Date: 10-18-96

Approved: Date:



Repeat Other Leg

3	24	Push-in Fasteners
2	2	Interior Panels (L, 1R)
1	1	A-Frame
		ITEM QTY DESCRIPTION (PART NO.)
		PART NO.

Title: Interior Panels

MatFlight Corp.

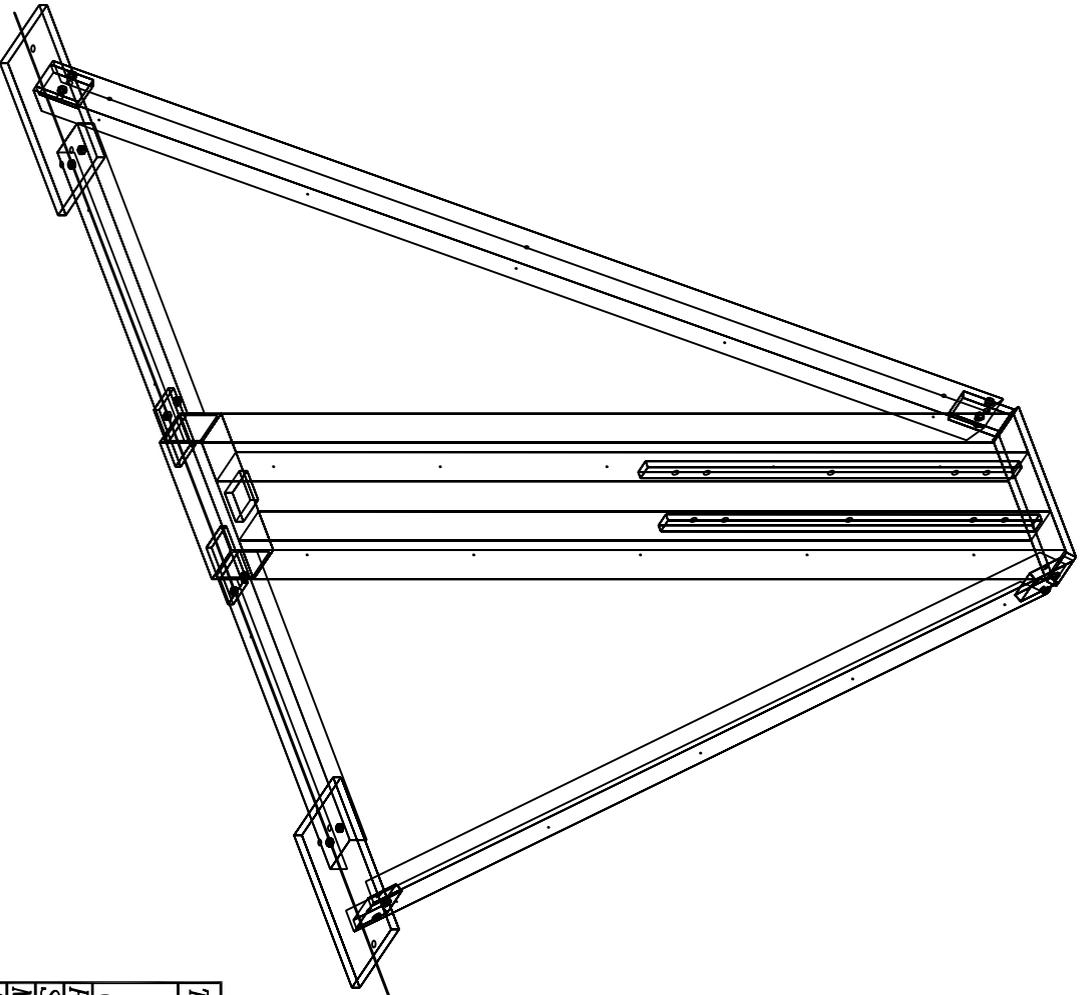
750 Airport Rd., Lakewood, N.J. 08701  
 (732)942-9898 Fax: (732)942-1114

P.N.: Dwg: EDA-003

Scale: None Dwn By: R.P.J.

Matl: Date: 07-16-97

Approved By: Date:



Stringline

Title: *STRINCLINE*

*MaxFlight Corp.*

750 Airport Rd., Lakewood, N.J. 08701

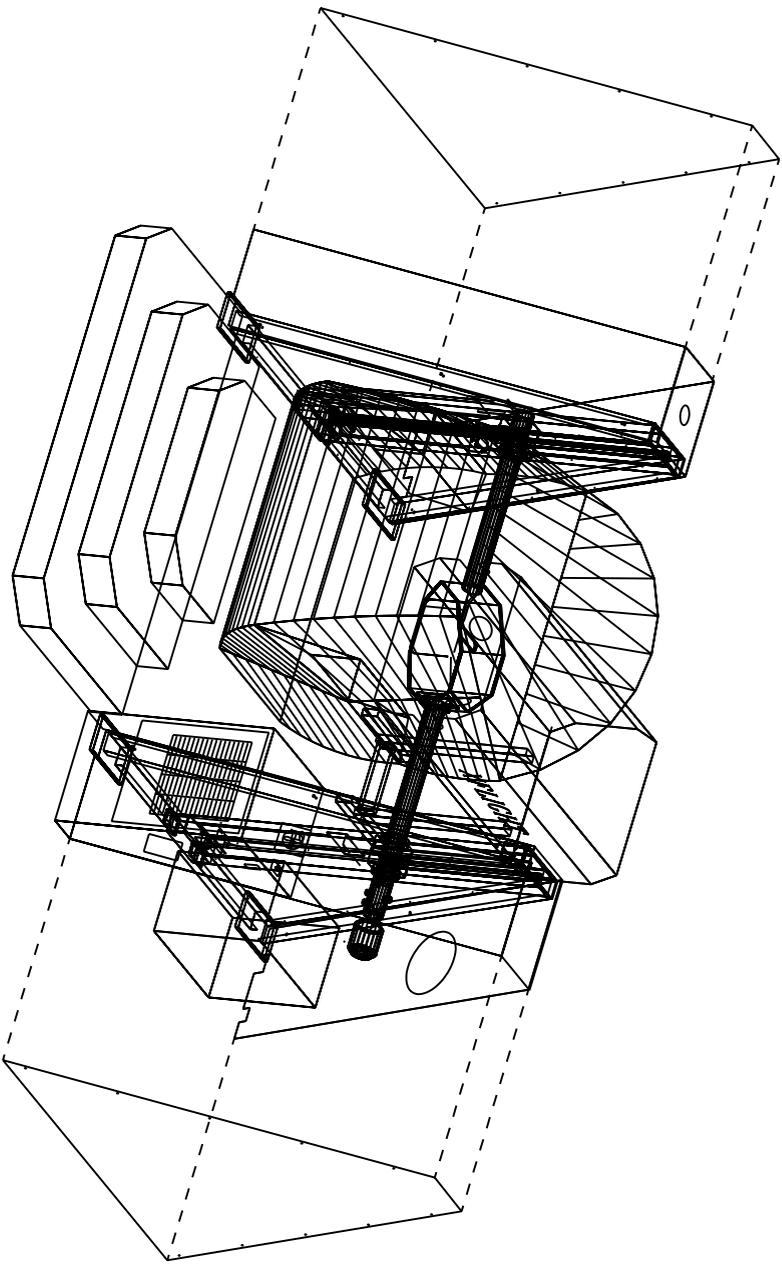
(732)942-9898 Fax: (732)942-1114

P.N.: *Dwg: EDA-002*

Scale: *None* Drawn By: *R.P.J.*

Mail: *Date: 07-16-97*

Approved By: *Date:*



Title: Face Panel Installation

MaxFlight Corp.

750 Airport Rd., Lakewood, N.J. 08701  
(732)942-9898 Fax: (732)942-1114

P.N. Dwg: FDA-121

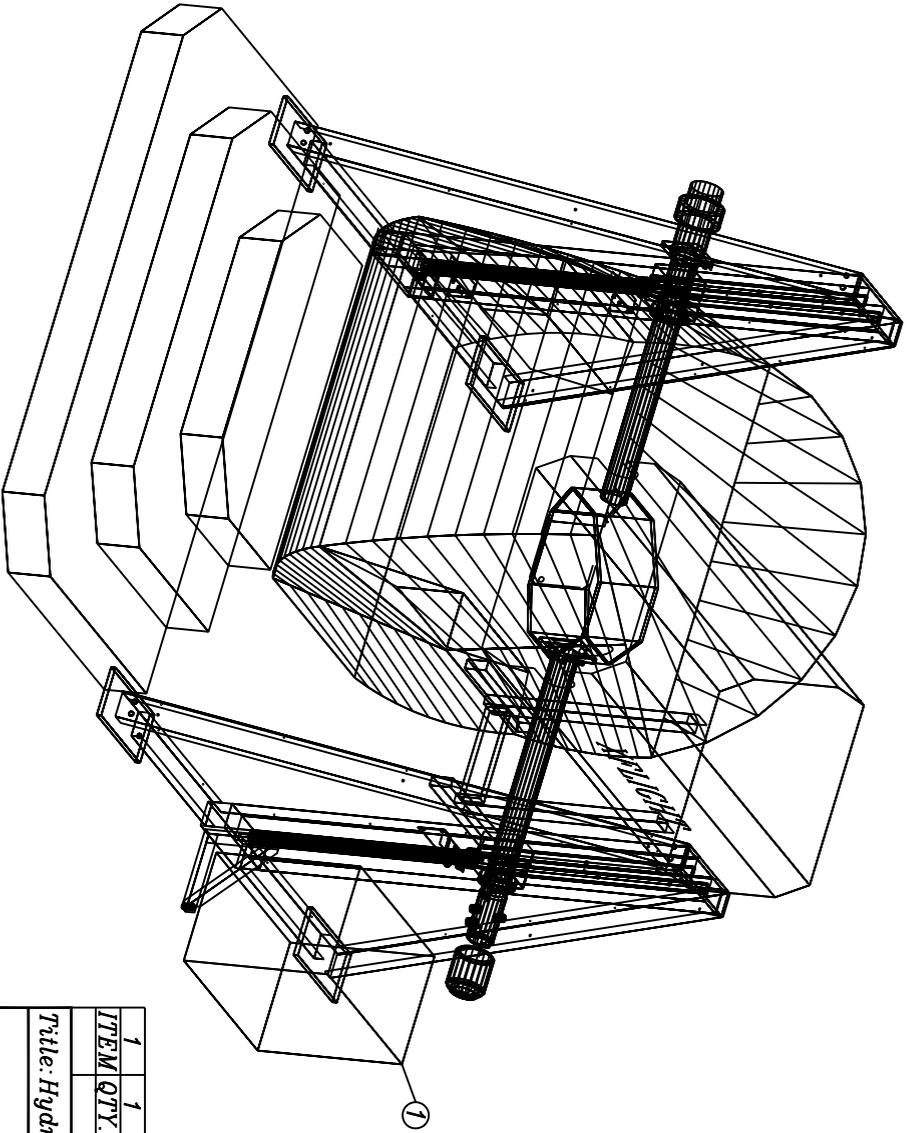
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Matl: Date: 10-22-97

Approved: Date:







1	1	Hydraulic Pump
ITEM QTY	DESCRIPTION(PART NO.)	
PARTS LIST		

Title: Hydraulic Pump Location - VR2002

MacFlight Corp.

750 Airport Rd. Lakewood, N.J. 08701

(732)942-9898 Fax: (732)942-1114

P.N. \_\_\_\_\_ Dwg: EDA-118

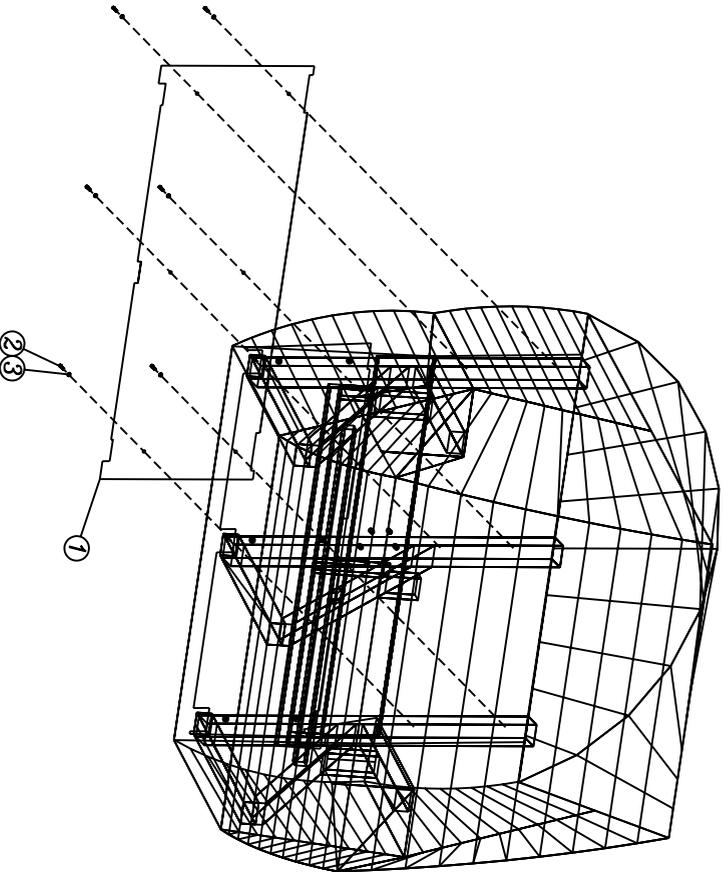
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Matl: \_\_\_\_\_ Date: 10-22-97

Approved: \_\_\_\_\_ Date: \_\_\_\_\_



Revision	
Rev.	Date/App.



Item	Qty.	Description (Part No.)
3	6	1/4" Lock Washer
2	6	1/4-20 x 3/4" Allen Head Bolt
1	1	A24-033

PARTS LIST

Title: Upper Rear Enclosure Panel-VR2002

MarFlight Corp.

750 Airport Rd. Lakewood, N.J. 08701  
 (732)942-9898 Fax: (732)942-1114

P.N.: Dwg: FDA-116

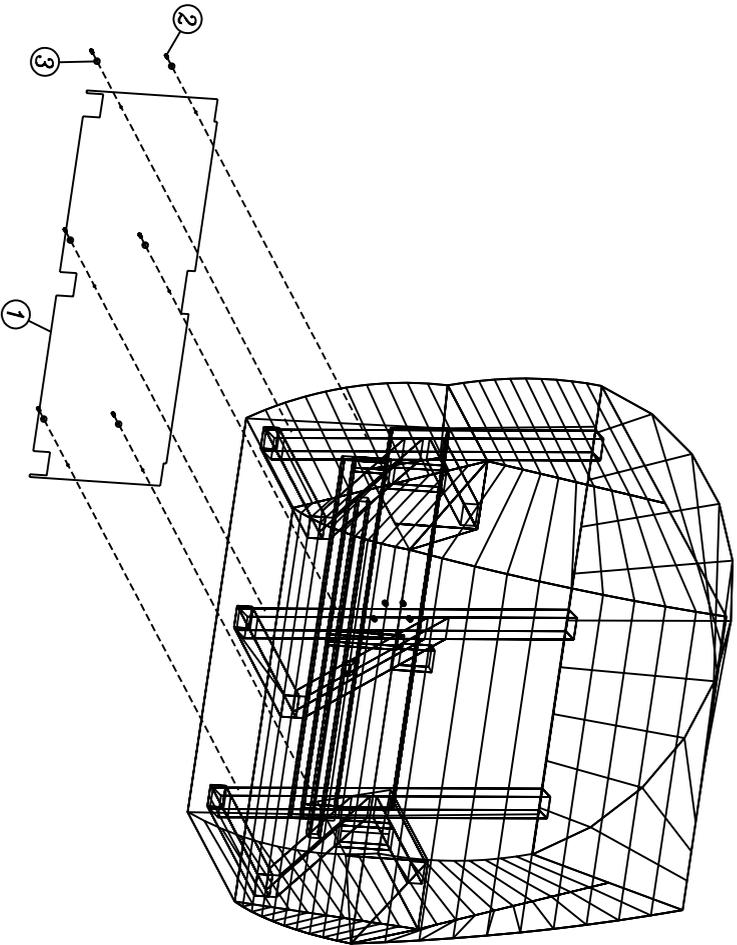
Scale: None Dwn By: R.P.J.

Matl: Date: 10-11-97

Approved By: Date:

- Notes:
1. Break all sharp edges.
  2. Sizes are in inches.

Revision		Date/App.
Rev.	Description	



Notes:  
 1. Break all sharp edges.  
 2. Sizes are in inches.

Item	Qty	Description/Part No.
3	6	1/4" Lock Washer
2	6	1/4-20 x 3/4" Allen Head Bolt
1	1	Rear Enclosure Panel(A23-040)
PARTS LIST		

Title: Rear Enclosure Panel-VR2002

MarFlight Corp.

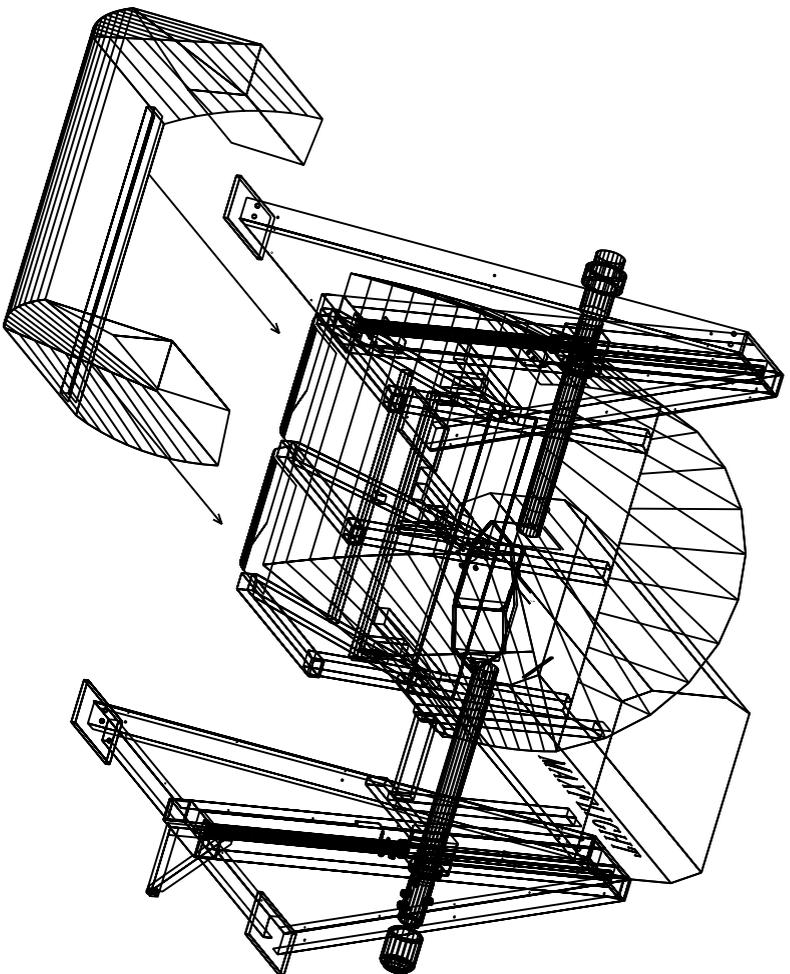
750 Airport Rd., Lakewood, N.J. 08701  
 (732)942-9898 Fax. (732)942-1114

P.N.: Dwg. EDA-115

Scale: None Dwn. By: R.P.J.

Matl: Date: 08-22-97

Approved By: Date:



4	8	1/4"	Nuts
3	8	1/4"	Lock Washer
2	12	5/16-18	Allen Head Bolt
1	1	Cockpit-VR2002	
ITEM QTY DESCRIPTION (PART NO.)			
PARTS LIST			

Title: Cockpit Mounting-VR2002

MacFlight Corp.

750 Airport Rd. Lakewood, N.J. 08701

(732)942-9898 Fax: (732)942-1114

P.N. Dwg: EDA-114

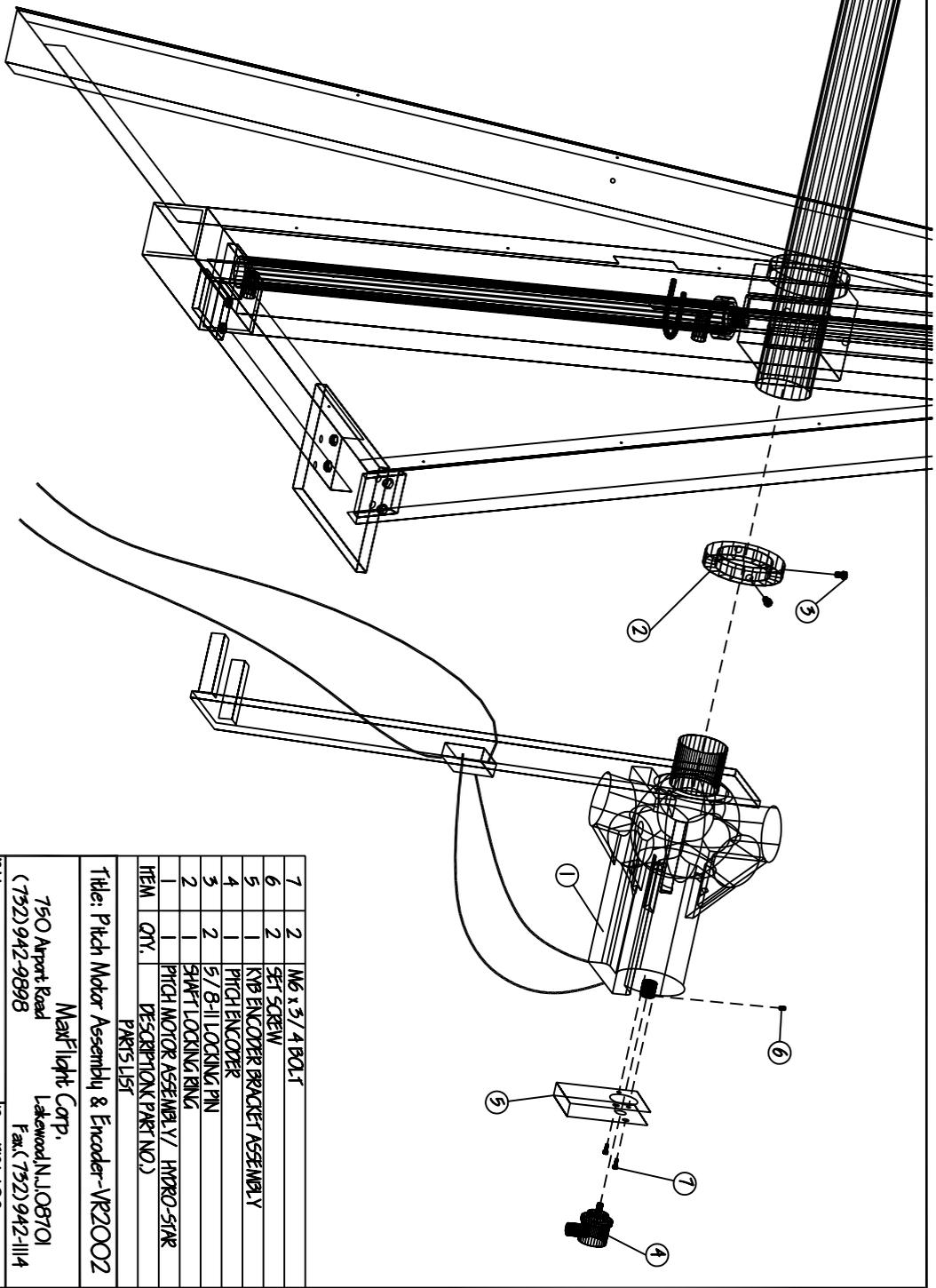
Scale: None Dwn By: R.P.J.

Matl: Date: 08-22-97

Approved: Date:







ITEM	QTY.	DESCRIPTION (PART NO.)
1	1	PITCH MOTOR ASSEMBLY / HYDRO-SINK
2	1	SHWFT LOCKING RING
3	2	5/8-11 LOCKING PIN
4	1	PITCH ENCODER
5	1	KYB ENCODER BRACKET ASSEMBLY
6	2	SET SCREW
7	2	M6 x 3 / 4 BOLT

**PARTS LIST**

Title: Pitch Motor Assembly & Encoder-VR2002

ManiFlight Corp.

750 Airport Road  
Lakewood, N.J. 08701  
Fax: (732) 942-1114

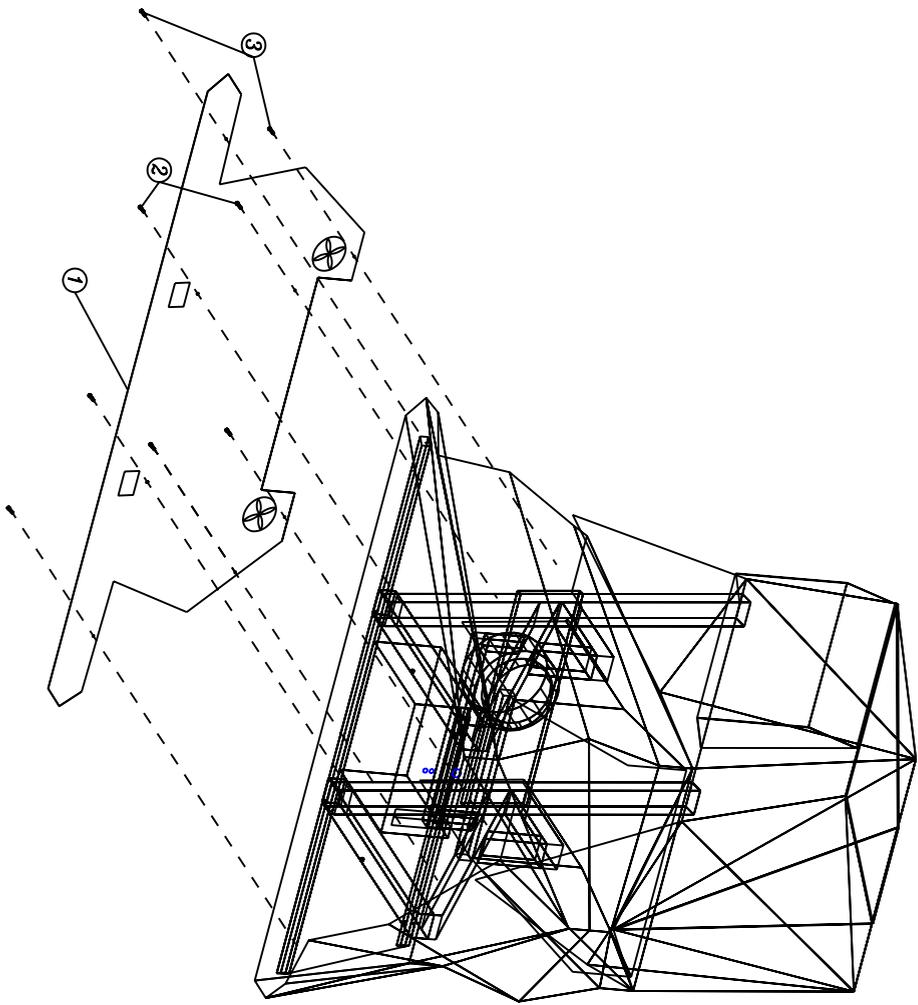
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Material: Date: 09-01-98

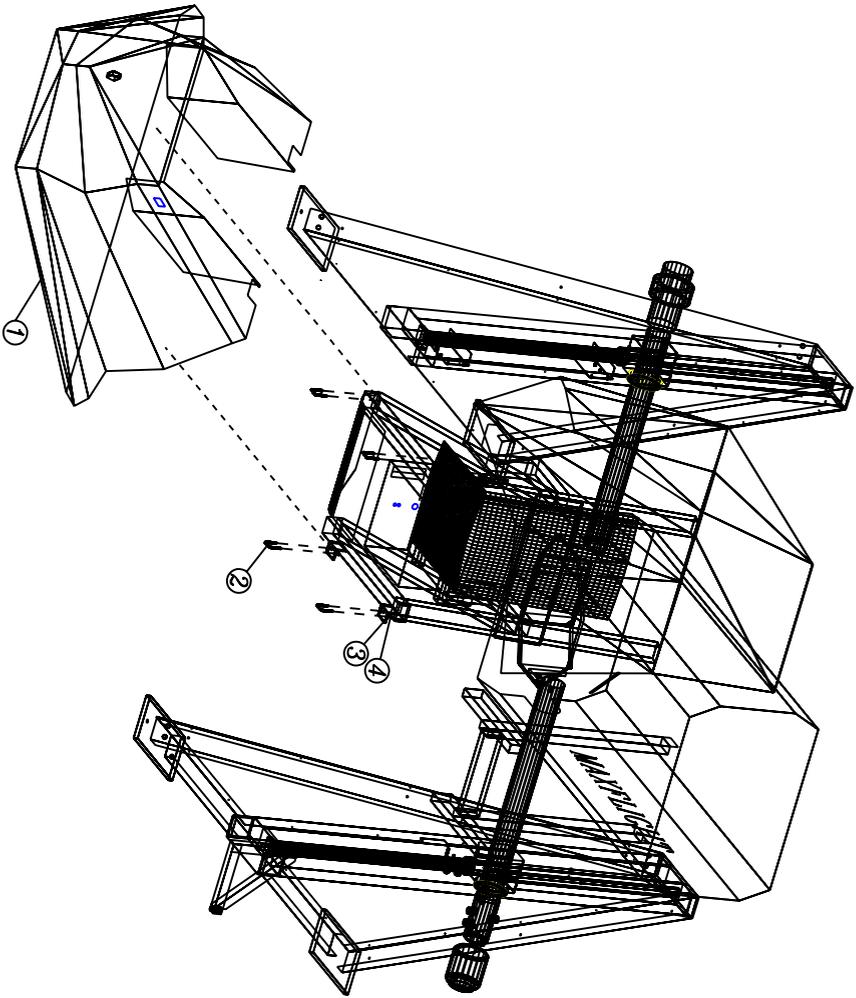
Approved: Date:





3	4	1"	#8 Phillips Head Screw
2	4	1/4-20 x 1"	Allen Head Bolt
1	1	Cockpit Backing Panel	
ITEM QTY: DESCRIPTION (PART NO.)			
PARTS LIST			
Title: Cockpit Backing Panel			

MaxFlight Corp.  
 750 Airport Rd., Lakewood, N.J. 08701  
 (732)942-9898 Fax: (732)942-1114  
 P.N. \_\_\_\_\_ Dwg: FDA-015  
 Scale: None Dwn By: R.P.J.  
 Matl: \_\_\_\_\_ Date: 10-26-96  
 Approved: \_\_\_\_\_ Date: \_\_\_\_\_



4	8	1/4" Nuts
3	8	1/4" Lock Washer
2	4	1/4-20 U-Bolt
1	1	Cockpit
ITEM QTY DESCRIPTION (PART NO.)		
PARTS LIST		

Title: Cockpit Mounting

MarFlight Corp.

750 Airport Rd., Lakewood, N.J. 08701  
 (732)942-9898 Fax: (732)942-1114

P.N. Dwg: FDA-014

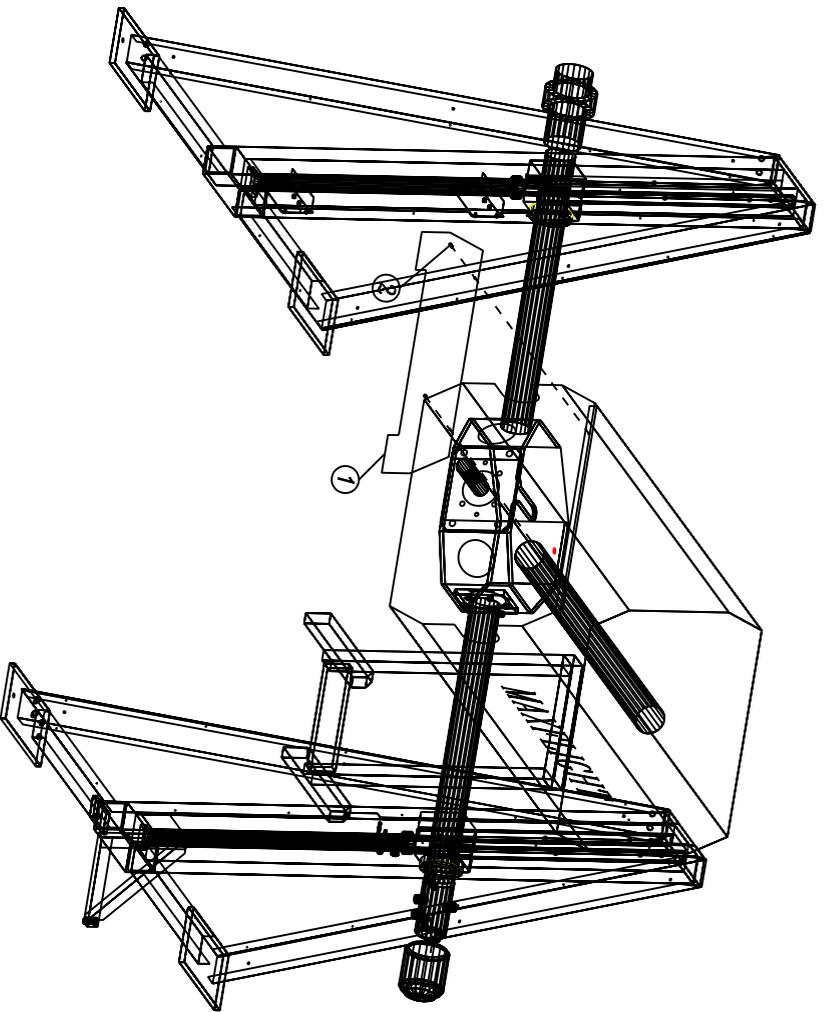
Scale: None Dwn. By: R.P.J.

Matl: Date: 07-23-97

Approved: Date:



Revision		
Rev	Description	Date/App.



Seat Frame & Canopy Removed For Clarity

2	2	Pine Tree Clips
1	1	Tail Enclosure Panel
ITEM QTY. DESCRIPTION(PART NO.)		
PARTS LIST		

Title: Tail Enclosure Panel

MarFlight Corp.

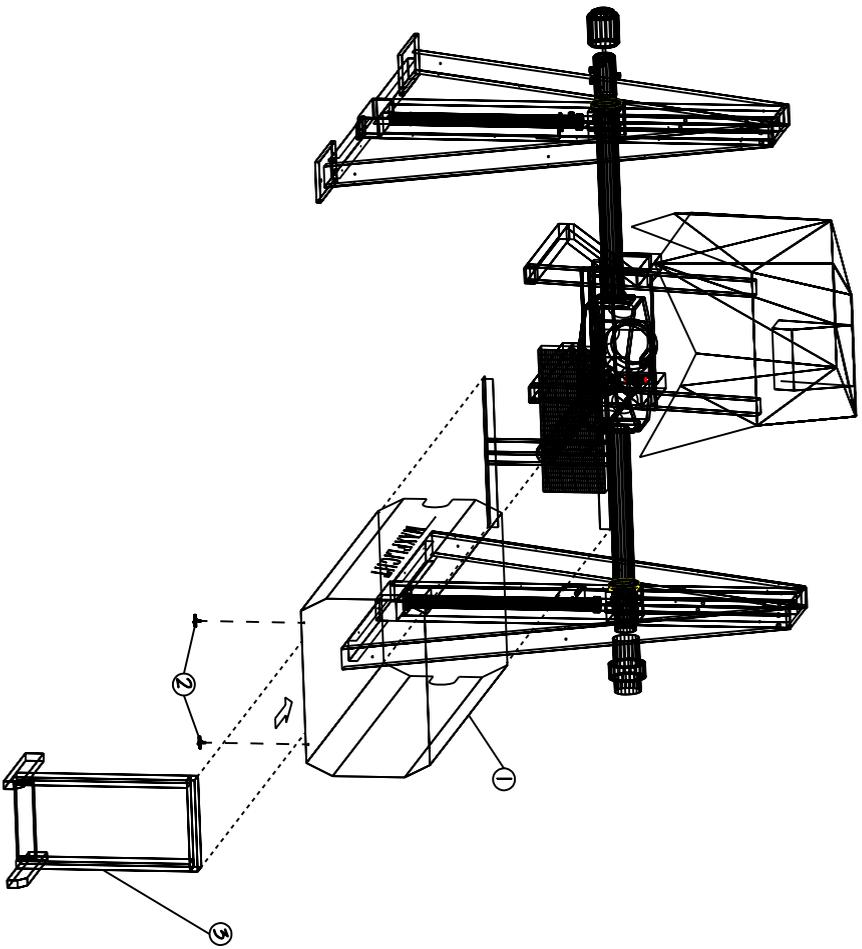
750 Airport Rd. Lakewood, N.J. 08701  
 (732)942-9898 Fax: (732)942-1114

P.N. Dwg: EDA-013

Scale: None Dwn. By: R.P.J.

Matl: Date: 07-22-97

Approved: Date:

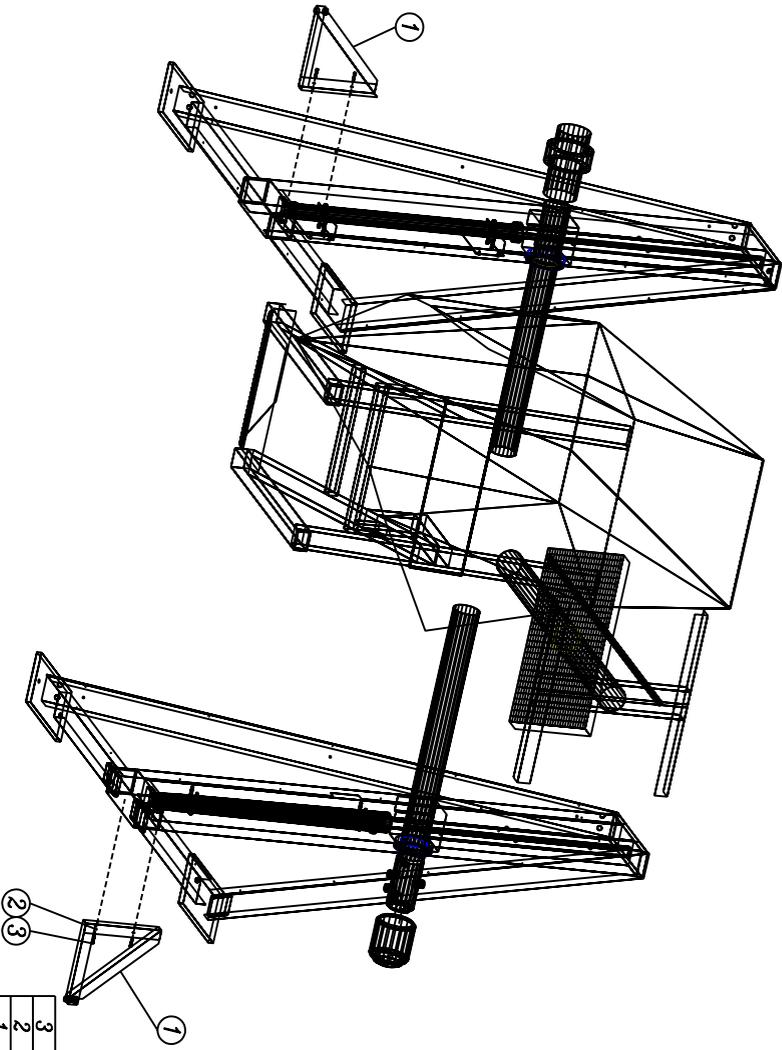


ITEM	QTY	DESCRIPTION (PART NO.)
3	1	Tail Stand
2	2	Tail Boom Security Knob
1	1	Tail Boom Structure (AZ5)

PARTS LIST

Title: Tail Boom

MaxFlight Corp.  
 750 Airport Road  
 Lakewood, N.J. 08701  
 (732) 942-9898 Fax: (732) 942-1114  
 P.N. Dwg: EDA-012  
 Scale: None Dwn Bui: R.P.J.  
 Mch: Date: 10-13-98  
 Approved: Date:



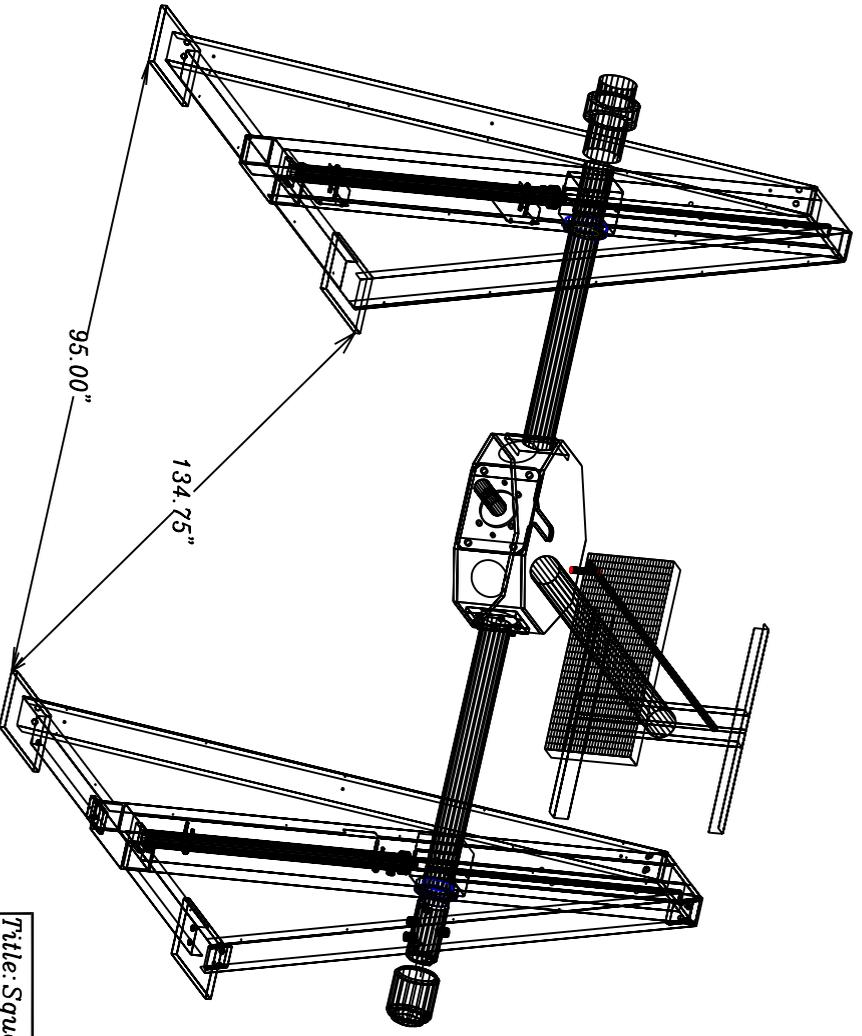
ITEM	QTY.	DESCRIPTION(PART NO.)
3	4	5/16" Lock Washers
2	4	5/16"-18 x 1" Allen Head Bolt
1	2	Leg Stabilizer

PARTS LIST

Title: Leg Stabilizers

MarFlight Corp.  
 750 Airport Rd., Lakewood, N.J. 08701  
 (732)942-9898 Fax: (732)942-1114

P.N. Dwg: EDA-011  
 Scale: None Dwn By: R.P.J.  
 Matl: Date: 07-21-97  
 Approved: Date:



Seat Frame & Canopy Removed For Clarity

Title: Squaring Legs	
MacFlight Corp. 750 Airport Rd. Lakewood, N.J. 08701 (732) 942-9898 Fax: (732) 942-1114	
P.N.	Dwg: EDA-010
Scale: None	Dwn By: R.P.J.
Mail:	Date: 07-21-97
Approved:	Date:

